COMMODORE

SPECIAL FUTURE ISSUE

COMPUTING INTERNATIONAL

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MARCH 1986

128, 64, C16, Plus/4 ????

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Memory for the 128...

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the game and the smash film...

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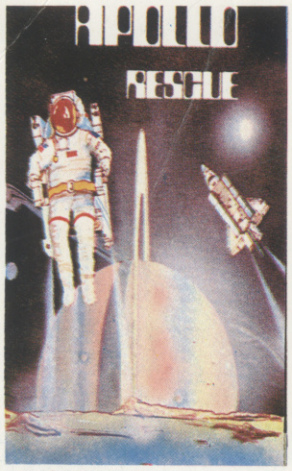
Tynesoft's January big name and value for money releases – watch out for our new titles on your machine every month in 1986.

FOR THE C16/PLUS 4, STARTER PACK 2



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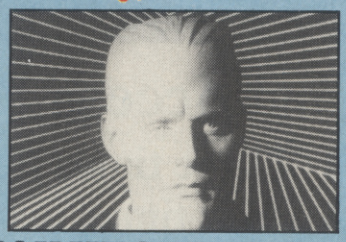

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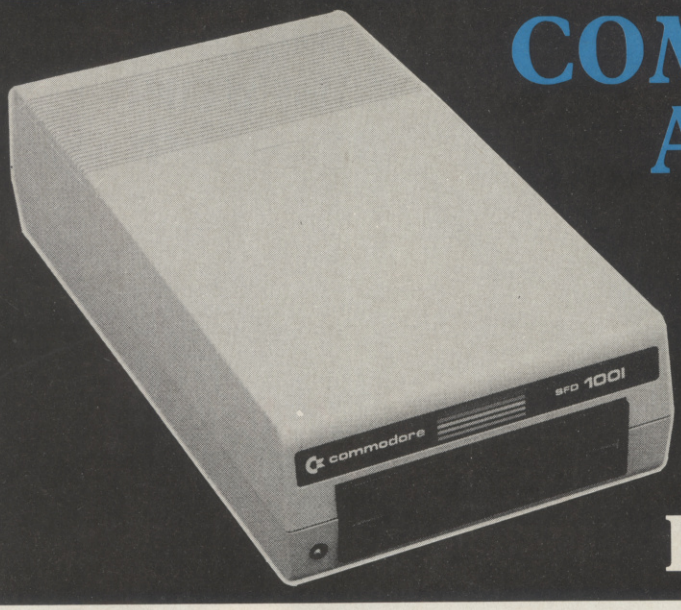
YOUR NEW DISK DRIVE FOR COMMODORE 128 AND 64



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...news...news

JOBS GO AT COMMODORE

Despite Christmas sales which far exceeded expectations and which managed to have Commodore floundering to supply enough computers to meet the demand, the production facility at Corby has been closed.

This means the loss of 250 jobs, most of which are assembly line workers, but others have gone from various white collar departments. This leaves only 170 employees at Corby, and reflecting these cuts is the move of Chris Kaday to Sales and Marketing Director, the position previously held by Paul Welch – who has now gone to Commodore Electronics on assignment, though whether he will return is open to debate.

Despite this move, and the apparent non-appearance of Commodore at the prestigious CES show during January, Commodore have still shown the Amiga at the Which Computer Show between 14-17 of January, and expectations seemed high.

Kaday comments: "Let those of you who already own Commodore products – and those who plan to buy them this year – rest assured on one point. We are here to stay."

OPTICAL DISKS

Optimem, the division of Xerox have announced – at last – a read/write capable optical disk. This allows vast amounts of memory to be accessed amazingly quickly, incomporably faster than any similar hard or floppy disks.

To coincide with this 3M have agreed to provide the media required, and this joint venture should have the product on the market within two years.

THE UPS AND DOWNS OF AMIGA

Some really surprising happenings have been going on recently in the Amiga world. An American syndicate of computer journalists recently voted it the worst hardware product of the year (equal with the IBM PCjr).

On the other hand the Observer just gave it a prize for the most impressive? To understand these differing views is almost impossible, although one software house I spoke to recently remarked on the difficulties of making the Amiga perform to the standard everyone expects, having seen demos such as Robot-City.

As they say, it's a mad mad mad world!

Comments...

Dear Reader,

It is ironic that the unfortunate changes on which Commodore comments in this issue of C.C.I. should take place just when so many new enthusiasts have become Commodore owners. In spite of the problems in the home computer market as a whole, the rise in Commodore numbers will in itself provide greater assurance for what is one of the most important factors in the enjoyment of owning a computer: a constant supply of new and improving software – games included, of course – and add-on hardware.

C.C.I. is very conscious of the need to encourage this supply and to tell you what you can buy that you will find most enjoyable and useful. To help you, this month, we have introduced a new and, we hope, regular feature: Money-off Vouchers.

You will see, at the back of the magazine a special page that offers C128/64, Plus/4 and C/16 owners vouchers, completely free to C.C.I. readers. These mean you can buy, direct, interesting products, including games, at lower than usual prices.

We believe you will find these free vouchers a useful way of reducing the cost of items you want to buy.

We deliberately chose to begin the voucher scheme not just with C64 products but also with games for the Plus/4 and C16 machines. C.C.I. thinks it is important to encourage manufacturers to increase the comparatively limited range available to these now much more widely used computers. Our information is that more manufacturers are beginning to look in the until now neglected direction of the Plus/4 and C16, in addition, of course, toward the more generally accepted C64.

The Money-off Vouchers are just one example of the changes and advantages for you we intend to introduce into C.C.I. over the coming months. We look forward to hearing your views on the good things you will find in C.C.I. in the future. In the famous phrase, if you like what we do, tell your friends, if you don't, tell us.

Yours sincerely,
Antony H Jacobson
Publisher

GOODIES GALORE!!

We've books, T-shirts, a Marconi trackerball, an Activision Music Studio, and lots more to give to YOU. Prizes will be sent to the first people who write to CCI listing in order of preference the contents of this issue.

If you are a Plus/4 owner, let us know what software you would like to see for the Plus/4. In return we have Plus/4 books to give away.

Don't forget to include your name and address.

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TASWORD 64

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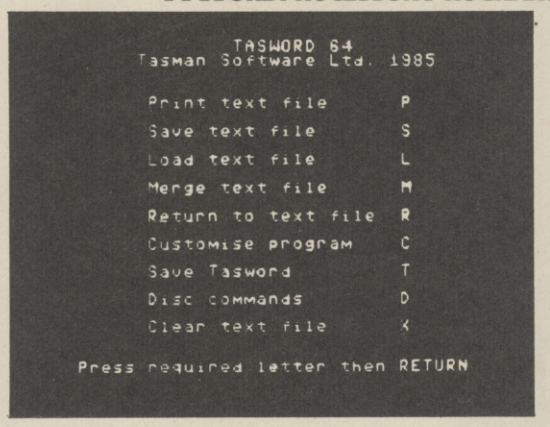
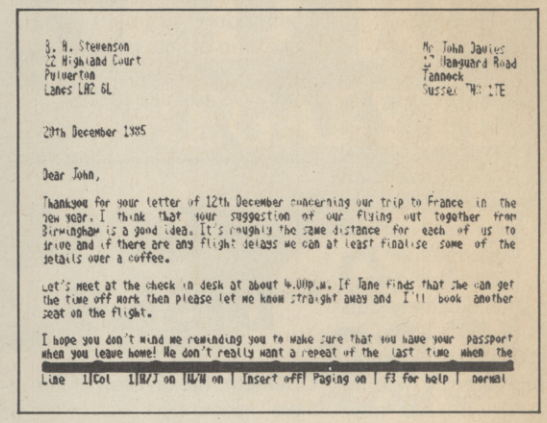
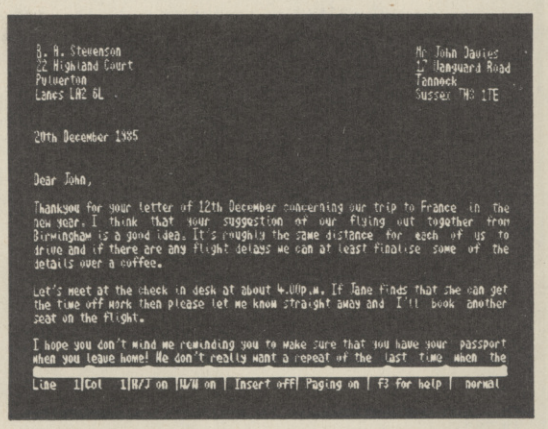
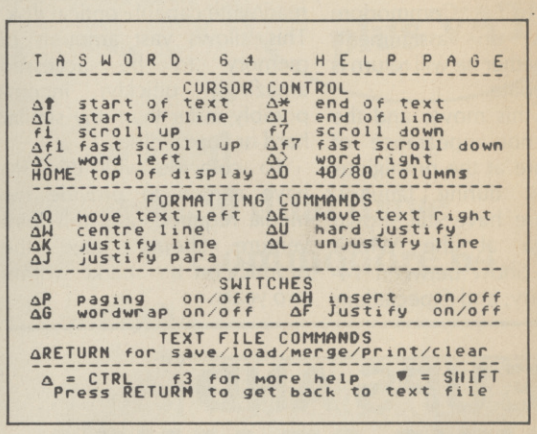
A WORDPROCESSOR PROGRAM THAT'S AS GOOD AS YOUR 64.









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CCI

...news...news

AMIGA CAUSES STIR AT WHICH?

Commodore appeared very pleased by the reaction of people to the Amiga at its UK debut on January 14th. The Commodore stand, dedicated almost entirely to the Amiga, showed it in its element, with the obligatory bouncing ball demos.

Also showing on the Commodore stand were software houses, parading the fruits of their development work. Notable among these was Cygnet, who showed an early version of their typesetting and basic newsletter making program.

Electronic Arts' newest package, Deluxe Paint was also there, and for the creative artist is must be the most complete package on a micro to date.

Chris Kaday, Sales and Marketing Manager for Commodore seemed pleased with the reaction of software houses to the Amiga:

"The European Developers Conference we held in December '85 was an outstanding success, and much of the software on show today was sourced in the UK", he said.

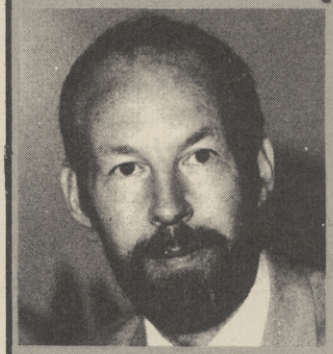
The crowds gathered around the Commodore stand at the Which? Computer show. The main attraction was the Amiga and its now famous bouncing ball demonstration.

QUIET LAUNCH FOR 128D

Although overshadowed by its newest brother, the 128D surprised quite a few people with its launch at the Which Computer Show? When I first saw the machine, nearly six months ago, it was just a 128 with a 1571 disk drive on the end. For its launch, Commodore have given it a box not unlike the Amiga and with a neat detachable keyboard.

Another surprise was the inclusion of a 1571 drive, which has been dropped as an accessory to the 128 due to costs. The 128D comes complete with a 40/80 column mono monitor and costs £499 + VAT.

Commodore Opinion...



This month's Commodore Comment comes to you from Chris Kaday, UK Sales and Marketing Director.

The opinions published here are those of Commodore, and do not necessarily concur with the views of CCI.

"I am sure that readers of this magazine cannot fail to have noticed the recent announcement from Commodore UK to close its production facility in Corby with a loss of some 250 jobs.

The reason for this decisive action was the existence of excess manufacturing capacity in Commodore worldwide and the need to concentrate production in fewer and higher technology plants. Naturally we greatly regret the effect on the employees concerned and on the Corby community, which has suffered more than its fair share of unemployment over the last few years.

However we still employ 170 people in our sales, marketing, service and distribution functions at Corby and the attention of this slimmed down team is now focused on the agressive marketing programmes which are aimed at retaining and growing Commodore's marketshare in the UK.

It is not anticipated that our action will affect prices, availability or support of our products. Our action has been necessary to ensure that our resources are in line with the size of the expected UK market for 1986 which, although significant, will be considerably smaller that it was during the boom times of 1983.

In order to ensure continued success in the UK the first of our marketing initiatives centred on the Which Computer? Show at the NEC from 14-17 January, where Commodore showed the Amiga to the public for the first time, as well as launching the 128D, a superb low priced small business machine. We were particularly excited about the exposure of the Amiga to the general public, as the previous behind closed doors presentations to the trade resulted in frankly ecstatic praise for the machine.

We are very positive about our future in the UK and whilst we appreciate the concern that our recent action has obviously caused, we are determined to succeed and will remain high profile presence in the UK computer market of 1986 and beyond.

Let those of you who already own Commodore products – and those who plan to buy them this year – rest assured on one point. We are here to stay."

Upgrade Your PET

Supersoft have announced several new products for Commodore's PET series.

Most PET's were sold with just 8 or 16K of RAM. Supersoft's RAM Plus boards allow an upgrade to a full 32K. Any 16K PET can have 32K of memory with the RAM Plus 16 (£55), while any large keyboard machine can be expanded from 8-32K with the RAM Plus 24 (£60).

Also new is the RAM Plus 24S (£60), a 24K expansion for the oldest 8K PET's with calculator-style keys and a built-in cassette deck.

Basic 2+4 Board (£65), allows any 40 column PET to run both Basic 2 and Basic 4. One command switches between the two, eliminating compatibility problems.

Lastly, Supersoft launch the RAMRON Board, a ROM/EPROM emulater with 8K of battery backed up RAM (£65). This is also available to special order with 16K or 32K or 32K of RAM (quotation on request).

Contact: Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Tel:01-861 1166.

Flow charter

Flowcharter is a machine language program which Supersoft claim "could revolutionise Basic programming for beginners and professionals".

It is a program for the 64 that will display or print a flow chart of a Basic program after it has been written. When you can't see what is going wrong with your program, Flowcharter provides you with a flow chart within seconds.

Flow charts can be displayed on the screen or printed out. Recommended printers include the Commodore 1525, 1526, MPS-801, MPS-803, and any Epson compatible dot matrix printers.

Flowcharter is available on disk (£14.95) or cassette (£12.95).

Contact: Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Tel:01-861 1166.

Plugs and Sockets

Plugs appear to be the thing of the moment judging by the number of press releases we've received on the subject.

Duraplug have introduced the MultiLine plug, a four-in-one 13amp enabling up to four appliances to be connectedto a single socket outlet without the need for additional plugs and adaptors. Available in black or white and fused at 5amps, the MultiLine plug costs around £5.

Also from Duraplug is the Duraline range of four-way socket outlets. The two models are the non-fused 4135 (£9) and fused 4136 (£11).

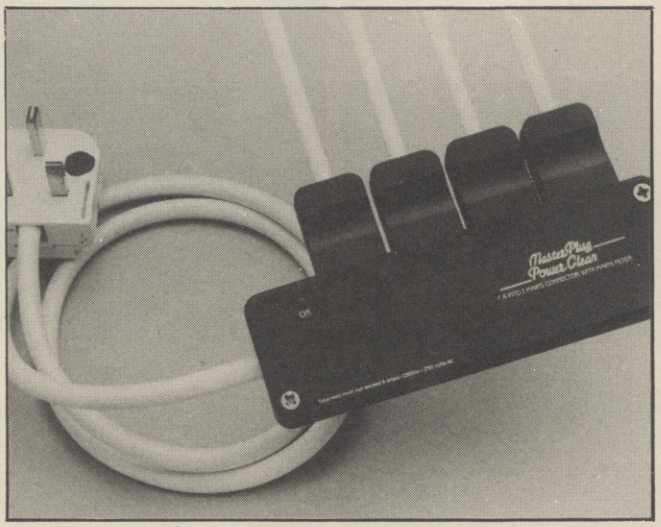
Both models feature a rocker on-off switch, a neon mains-on indicator and a removable terminal cover for easy wiring. The sockets can also be fastened to walls without the need to detach the main cover.

Smoothline is a new four-way filtered connector from Conblock Electrical, designed specifically for better home computing. Providing four filtered outlets (each rated at 6amps max), the Smoothline comes complete with mains lead and plug, and is fitted with four minature plugs for wiring to computer equipment.

Costing £18.99, the Smoothline eliminates many of the system problems caused by interference transimitted via the mains supply.

Contacts: Duraplug Electricals Ltd, Westwood Works, Margate Road, Broadstairs, Kent CT10 2QL. Tel:0843 68771

Conblock Electrical Ltd, Mochdre Industrial Estate, Newton, Powys, S Wales. Tel:0686 27100.



Computers in Education

Collegiate Microcomputer is an American journal which offers a forum for the exchange of ideas on the role of the microcomputer in all subjects and areas of college and university life.

The publishers are calling for papers for inclusion in the journal. Material appearing includes uses of hardware and software, descriptions of courses, units and topics using microcomputers, results of research using microcomputers, analysis of experiments using microcomputers, projects, suggestions and tips, write-ups of experiences as microcomputer consultants, reviews of literature, evaluation of microcomputer use in the office and in materials preparation for teaching and research.

Subscription rates are $28 per year and $36 per year for non-US subscriptions.

Contact: Collegiate Microcomputer, Rose-Hulman Institute of Technology, Terre Haute, IN 47803, USA.

64/128 Modem

Miracle Technology's new 64 Multimodem gives access not only to Prestel, Micronet, Microlink and viewdata services, but also to databases, bulletin boards, electronic mail, telex and user-user communications.

Menu-driven and multi-speed, 64 Multimodem supports CCITT V21/23 and Bell 103 standards, handling baud rates of 300/300, 1200/75 and 75/1200. All software is on-board in ROM. Features include autoanswer, autodial, save and print frame, automailbox with edit and save and telesoftware downloading.

The modem, costing £98.50 (£116.15 inc VAT and UK delivery), fits the computer's cartridge port.

Contact: Miracle Technology, St Peters Street, Ipswich IPI 1XB. Tel:0473 50304

EPAD for Modem

Tandata now have an enhanced version of the Tm512 modem. The Tm512E features EPAD, the error-checking protocol developed for use on PSS (Packet Switch Services). EPAD is designed to ensure error-free data transfer to and from a terminal or computer and the PAD (Packet Assembler/Disassembler).

Retailing at £339 exc VAT, the Tm512E auto-dial, auto-answer modem operates at V21 (300/300 bps), V23 (1200/75, 75/1200bps and 1200/1200 half duplex) with Bell available for oversea use. The modem's microprocessor and operating system senses the speed and parity at which its micro/terminal talks to the modem, will select from traditional pulse or tone dial telephone line by 'listening' to the line and will automatically select the right baud rate to use when the host computer's modem answers without the modem or the micro/terminal having to be re-configurated.

Contact: Tandata Marketing Ltd, Albert Road North, Malvern, Worcs WR14 2TL. Tel: 06845 68421.

Electronic Music

Learning a few simple notes, or making professional sounds – the musical possiblities of your home computer are endless.

Electronic music has become very popular in recent years. From the electronic sounds of groups such as Kraftwerk and Jean Michel Jarre to the computer generated effects heard on Paul Hardcastle's 19, the computer plays various roles in the generation and production of music.

In the recording studio it is not unusual for a drummer to be replaced by an electronic drum machine. On stage you will undoubtedly find a microprocessor in some form.

Computer-generated music has, in the past, been criticised for sounding too 'clean'. The lack of spontaneous creativity – and the lack of mistakes. The instruments of today are capable of almost anything – some even have the facility to introduce random mistakes!

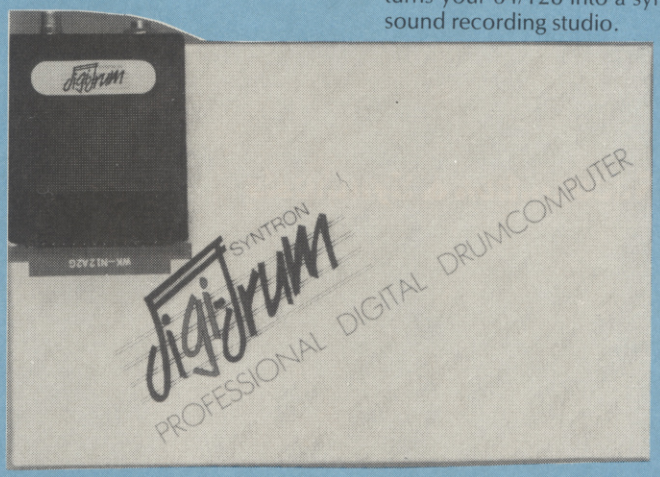
Music and the home computer is an area of computing that is fast expanding. There are numerous musical software packages around to enable you to make music with your micro, but it is the add-on musical peripherals that we are focusing on in this issue.

For beginners

If you are not a musician, but would like to learn how to get the best out of your computers musical capabilities, an ideal package to start with is Commodore's Music Maker. At under £20, Music Maker turns your 64 into a keyboard via a keyboard overlay and accompanying software. You can easily pick up the basics of music and write your own tunes.

Additionally from Commodore are the Playalong albums. Although not really a peripheral, they are so good that we will stretch the rules a little here.

Three Playalong albums are currently available: Pop, Classics and the Beatles. These albums allow someone with absolutely no musical knowledge to play along with well-known hits. You can quickly learn to play the songs yourself and can soon astound friends and relations with your new-found talent!



Sampling sounds

It is also possible now to produce effects such as those found on Paul Hardcastle's Number One hit record, 19, with your computer. These are achieved by means of a digital sampler.

Three samplers appeared on the market almost simultaneously last summer. Commodore again have the perfect product for the beginnner – the Sound Sampler. The cheapest of the bunch, it turns your 64/128 into a synthesiser and a sound recording studio.

A sampler samples sounds. You can record any sound from a piece of music to a cough or slamming door and play that sound back at a faster/slower speed, backwards, repeated or looped.

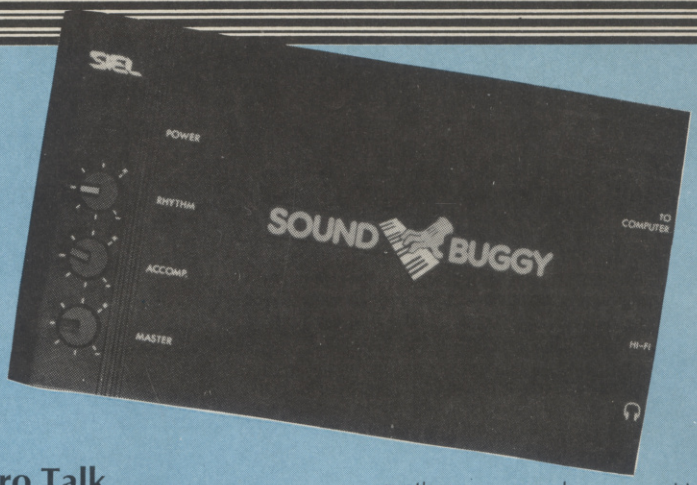
Microsound market the Autographics Digital Music System, designed to give musical results similar to those produced by expensive multi-track recording studios. The software is designed to be used via your computer's Qwerty keyboard in addition to Microsound's keyboard.

The sampler most suited to professionals is the Microvox sampler from Supersoft. Including its own keyboard, it comes with a comprehensive library disk of sample sounds including the now infamous Suzy giggle. (Try keeping a straight face when listening to it.) It also has the recommendation of Feargal Sharkey, who was one of the first people to own a Microvox sampler.

Beat the drum

If you've always fancied yourself as a demon drummer, Syndromic's Digidrum will be the answer to your dreams. It is a professional digital drumcomputer designed to operate with the 64, using 'live' digital sound samples which are encoded onto the software.

Additional software is now available in the form of Sound Set 1. Over 50 new sampled sounds are included from tom-toms to Latin effect.



Enhancing Sound

While many of the available products make use of the capabilities of the 64's SID chip, others are appearing on the market which give your computer extra sounds.

Siel's Sound Buggy, for example, allows the user complete control over a new sound chip. Commodore's Sound Expander turns the computer into a generator, enabling eleven voices to be used at one time.

With the event of MIDI (musical instrument digital interface), the option of attaching a musical keyboard to your home computer arises. Any MIDI keyboard can be interface via a MIDI interface. Siel's CMK 49 is designed specifically for the 64 and, as such, fits directly to the expansion port eliminating the extra expense of an interface.

Micro Talk

Another area of computer sound is, of course, speech recognition and synthesis. Somewhat surprisingly, there are now less speech products on the market than this time last year.

Voicemaster, from Anirog, combines three functions in one package: speech synthesis, word recognition, and composing and performing music in real time. Unfortunately, this is another product that is no longer being promoted, so if you're interested rush down to your local computer dealer while stocks last.

For details on a wide variety of sound products, refer to our checklist.

Speech Recognition & Synthesis

Product	Features	Machine	Price	Company
Sweet Talker	Synthesiser – allophone system, 3" square, 1½" high, gives examples & demonstrations. Shape & colour as Commodore	64	£24.95	Cheetah
Voicemaster	Unique 3-in-one package, speech reproduction, speaks in own voice. Voice harp – just whistle or hum to produce music	64	£59.95	Anirog
Currah Speech 64	"Y" cable available, converts text to speech direct from screen, uses allo phones system, infinite vocab.	64 (compatible with C128)	£21.95	Welwyn Electronics

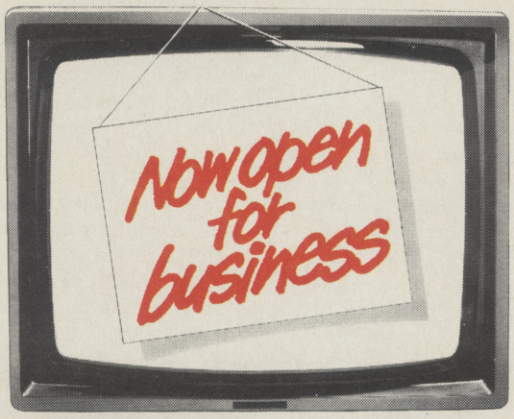
MUSIC ADD-ONS

Product	Features	Machine	Price	Company
Datel Sampler	Hardware in corporates full 8-bit D to A and ADC conversion. Software includes sample editing	64	£49.99	Datel
Music Maker	Starter program. Turns 64 into keyboard.	64,128	£19.99	Music Sales
Playalong Albums	3 available : Pop, Classics, Beatles. 12 songs. Auto playback or will teach to play melody.	64, 128	£9.99	Music Sales
Sound Studio	2 programs in 1. (1) Turns computer into synthesizer. On screen controls. 60 sounds in memory. (2) sound recording studio (3 channels). Real step time.	64,128	14.99	Music Sales
Sound Sampler	Hardware & software package with audio lead and mike. Samples and digitizes sound. Editing facilities. Pitch sampler. Drum & echo facilities.	64,128	£69.99	Music Sales
Sound Expander	Hardware & software package. Gives 64 extra sounds. Turns computer into generator using F.M. technology. Enables 11 voices to be used at one time. Easy play features built in.	64,128	£99.99	Music Sales

Stop playing games– Start earning money!

The computer that's been giving you such a fun time with games now gives you the chance to earn some money. Helping you with word processing, secretarial work and even running your own business.

All because of the brilliant new word processing package, SuperScript from MicroPro — the makers of WordStar — the world's best selling word processing packages for microcomputers.



SuperScript **writes letters, invoices, reports, tables, documents, it stores, edits and even checks spelling.**

Versatile SuperScript SuperScript combines word processor, spelling checker, calculator and mail-merge facility, all in one package. So SuperScript gives you all the tools you need to produce high quality reports, tables, lists, personalised letters and prints labels quickly and efficiently.

Simple for the beginner If you are a newcomer to word processing, SuperScript puts you immediately at ease.
Each command is a single word, and for each command you simply move the cursor. You don't even have to type the command.

Good with numbers SuperScript allows you to extend your editing line up to 250 columns for wide documents like financial statements, and with decimal tabs it's easy to enter properly justified tables of numbers.
SuperScript's complete set of calculator functions can be used interactively or you can operate on numbers from the text of your document. Apart from the usual mathematical functions like add, subtract, multiply, divide, and percentages, you have the ability to add rows, columns or even whole tables.

Good with spelling, too The built-in spelling checker goes right through your text, checking for errors. You have the option to correct any error, ignore it, or add the word to its 30,000 word dictionary.

Editing options SuperScript gives you all the editing options of a business-style word processor, with full block manipulation for cut-and-paste; overtype or text insertion modes; search and replace with pattern matching and optional case discrimination; backward search, case shifts for single words or larger blocks of text. And much more.

Powerful for the experienced user SuperScript also gives you the ability to cut work down to a minimum by storing your own command sequences or text on single keys. This means that with a single keystroke you can reproduce commonly used phrases or multi-line addresses from a glossary, load in document formats or execute a pre-programmed sequence of operations.

Mailings with SuperScript Personalised mailings are easy with SuperScript. You can enter the data manually or use data extracted from your spreadsheet or database. Merging can be selective. A mailing labels template is included to help you complete your mailing and you can alter the template to suit your own label format.

Attention Easy Script users! If you're already an Easy Script user, then SuperScript is the obvious next step. With its enhanced features and more powerful facilities, you'll be able to do so much more. There are no compatibility problems either. You can run your Easy Script data or Easy Spell dictionary disks under SuperScript. And by returning your Easy Script disk can obtain an upgrade for just £49.95.

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QTY ☐ †Upgrade for Easy Script £49.95 (includes P&P) for* _____ computer

†(Your existing Easy Script disk should be returned with this order.) *Commodore 64, 128. Atari 800XL, 130XE. Apple IIc, IIe

I enclose remittance for £_____ (Cheques made payable to CUMANA Ltd). Or charge my credit card

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Name _____
(BLOCK CAPS)
Address _____

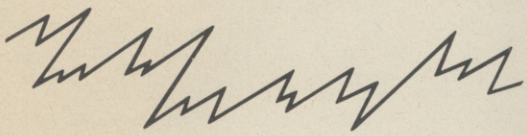
_____ Postcode _____

If you are intending to use SuperScript for a specific purpose, we should be interested to have details. Thank You _____

Music Add-Ons (cont)

Product	Features	Machine	Price	Company
Syntron Digidrum	Hardware/software package. Using 64 'live' or real recorded drum digital samples the Digidrum allows patterns and songs to be built up and recorded, software comes complete with 16 samples. 8 standard kit and 8 glass samples, Demo songs and patterns provided. Audio and trigger outputs.	64	£65.00	Syndromic
Sound Set 1	Disk containing over 50 new samples for Syntron Digidrum. Latin and Syndrum kits plus full selection of tom-toms, sweep, pitchbend toms, cymbals, hihats, Latin effects and syndrum effects. Also in Cassette.	C16	£16.50	Syndromic
Digital Music System (Microsound)	Designed to provide the ability not only to play back the sampled sounds at various pitches, but also to create complex sounds using Dynamic Amplitude Modulation, Definable Pointer sets, Looping, Reversing, and mixing different sample sounds. Keyboard is a full size 4 octave unit that connects to the 64 via the games ports and requires no external power supply.	64	£165.22	Autographics
RMS 6H	JMS Midi Master Synchronizer allows synchronisation of conventional trigger signals and Sync Signals with MIDI synchron code. Each capable of controlling several devices.	64	£239.00	Rosetti
RMS 20C	Midi Multitrack Composer. An effective step time Composer program offering six channels with Computer input one note at a time. Editing facilities include pitch, gate time, velocity, sound changes and transfer.	64	£49.95	Rosetti
Microvox	Package consists of sampling unit, system disk (with 'start-up' samples) and Library disk. The sampling unit has two programmable 24dB/octave filters and gives a S/N ratio of 59 dB.	64	£229.95	Supersoft
Siel CMK 49	Music Keyboard, 4 octaves, fits directly to expansion port, software allows complete control over SID chip, programming in mono and poly modes, MIDI Master Keyboard function w/split facility, 99 sounds per file possible, 40 sounds immediately available, demo songs.	64	£125.00	Syndromic
Siel Sound Buggy	Comes complete with overlay clip-on keyboard but can be controlled via the CMK 49 keyboard. Allows the user complete control over a new sound chip, auto-accompaniment melody sequencer, sounds and rhythms already programmed, MIDI facilities include Receive/Transmit plus channel and program change for four individual MIDI lines.	64	£99.00	Syndromic
MCS	Combines interface, MIDI link and comprehensive disk software	64	£200	Joreth Music
AMS	Editor, keyboard, linker synthesiser and MIDI modules	64/128	£39.95	Rainbird

Your key to communications!



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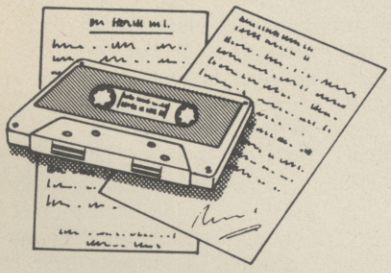

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Modems: the Art of Communication

Buy a modem and you'll never look back as you enter the vast world of communications. You will be able to communicate with bulletin board systems, information services, mainframe computers and other home computers.

What is a modem?

A quick bit of technical background first. Modem is a shortened version of the two words which describe its function – Moddulator and DEModulator. To send data over telephone lines the binary signals used by a computer must be converted to the analogue signals understood by the telephone lines – this is the modulation end of the process.

To receive data, the audio signals of the telephone are converted into the electrical impulses of the computer – this is demodulation.

In short, a modem acts as an interpreter, converting the computer's language into one understood by the telephone.

Choosing a modem

The most important variance between different kinds of modems is that of speed: how fast can the modem send or receive a certain amount of information. Your decision will depend on how extensively you intend to use a modem.

When talking about the speed of a modem, you will come across the term baud rate. A very basic explanation of baud is that the baud rate is the number of characters per second the modem can send, divided by 10. For example a 300 baud modem, the slowest used, can send about 30 characters per second.

One of the fastest-growing uses of home computers is the field of telecommunications. This means using your computer to send and receive data over telephone lines. To do this you need a modem.

Modems at each end of a system must send and receive data at the same speed in order to communicate. The three most commons standards are: the 300/300 where both micros transmit and receive at 300bps; 1200/75, with the host transmitting at 1200bps and the user terminal transmitting at 75bps; and similarly the 75/1200 where the host transmits at 75bps and the user transmits at 1200bps; and finally the 1200/1200 where both transmit and receive at 1200bps.

There are modems available which are capable of transmitting at all these speeds.

Other features to consider include auto-answer and auto-dial. The auto-answer function enables the modem to answer the phone and prepare to receive instruction without need for any human assistance. Auto-dial makes life much simpler when dialling engaged numbers. Auto-recall will try to contact any unobtainable numbers.

What to do with it

Particularly with regards to business users, the two most popular reasons for purchasing a modem have been Prestel and Telecom Gold, both inexpensive ways of accessing large amounts of general data ranging from weather forecasts to flight times.

Whereas Prestel has become known for its vast base of information, Telecom Gold is perhaps most widely known as the biggest mailbox service in England.

Mailbox

A mailbox system enables you to send messages to another user, in this country or abroad. You write the message on your computer, send it via the modem to a mainframe line which then stores the message until the person you sent the message to logs on to the system. The message is then displayed on his screen to be read at leisure.

Bulletin Boards

Bulletin boards are appearing in large numbers as more people enter the field of communications from the home. Set up by individual enthusiasts, these can provide information ranging from computing advice to a forum for music views.

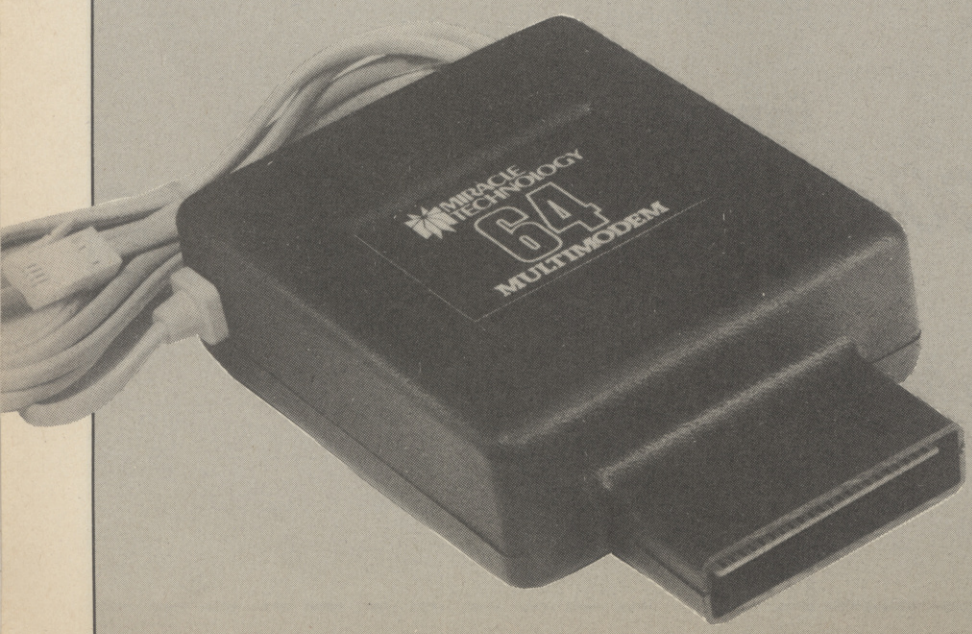
Compunet and Micronet 800

Micronet 800 and Commodore's own Compunet are the two networks you will probably hear most about. Both offer a comprehesive selection of services. You can take or offer advice to other users, take advantage of the free software or purchase programs, play games or talk with other users.

MUD

MUD, a multi-user game created on mainframes at Essex University, has gained rapidly in popularity. For the cost of a phone call, you can take part in a vast game of dungeons and dragons with other users.

In addition to Essex MUD, there is Compunet's own MUD and British Telecom have been promising a version which should be released soon. (Keep up to date with all the MUD gossip in our regular MUD column.)



MODEMS

Product	Features	Machine	Price	Company
Multimodem	Multi-speed, baud rates of 300/300, 1200/75, 75/1200. Auto-dial, auto answer, auto-mailbox	64	£98.50	Miracle
Tm512E	Auto-dial, auto-answer, operates at V21 and V23. EPAD	64	£339	Tandata
Voyager	Operates V21 and V23. Auto-dial, auto-answer, optional add-ons	64	£79.95	Modem House
TM 110	1200/75 bps V23 full duplex mode. Able to store and access data in its own CMOS RAM. RS232 micro interface, auto-dial/auto-recall and auto transmission of ID. Up to 8 telephone numbers can be stored.	64, VIC 20	£99	Tandata
TM 200	Includes all the features of the TM 110 and in addition to 1200/75 baud full duplex also 75/1200 bps full duplex, 1200/1200 half duplex to allow two micros to 'chat' and 300/300 bps full duplex with answer and originate mode allowing use with many conventional databases.	64, VIC 20	£173	Tandata
Modem 1000	Can access Prestel, Micronet, with option to access B.T. Gold and 1275 Bulletin boards. Free quarter's susbscription to Micronet with every purchase from Modem House.	64, 128	£99.95	Modem House
WS 2000	Single-unit multi-standard, multi-speed, offering a very wide choice of operational facilities. Can transmit and receive at 300 baud full duplex, 600 baud half duplex, 1200 baud half duplex and Prestel/Telecom Gold.	All with RS232/serial interface	£129.95	Miracle Technology
WS 3000 V2123	Fully intelligent, keyboard-instructed, autodialling, auto-answering. Supports both CCITT and Bell standards, 60-number internal telephone directory, speed buffered RS 232 port. Allows 300, 600, 1200, 1200/75 and 75/1200 baud rates.	All with RS232/serial inteface	£295.00	Miracle Technology
WS 3000 V22	Adds 1200 baud full duplex	All with RS 232/serial interface	£495.00	Miracle Technology
WS 3000 V22bis	Adds 2400 baud full duplex. Protect 3000 Data Security Option £98 when purchased with modem.	All with RS232/serial interface	£650.00	Miracle Technology
Commodore Communications Modem	1200/75 V23 full duplex, asynchronous operation. Easy to fit, easy to use. Connection direct to the cartridge port of a 64 and direct to a British Telecom series 600 socket. Compunet software held in ROM (8K) for immediate interaction after switch on. Soft load options provide 64 to 64 direct communication. One year's free subscription to Compunet.	64	£99.99	Commodore

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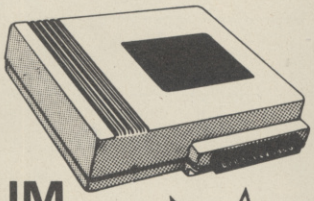
COM-DRUM



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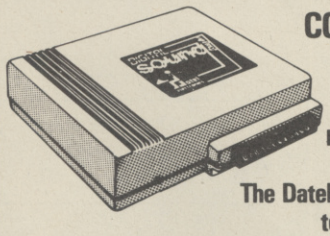

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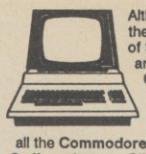
128

If you're as **impressed** as we are with the new **Commodore 128**, you'll be even more **impressed** with the new software that's appearing for it now! Already we've got **SuperBase 128** (~~£99.95~~ £85.00!), **SuperScript 128** (~~£79.95~~ £69.95!), and the amazing **VizaWrite Classic 128** (~~£89.95~~ £89.00!)... so watch this space!



Although we are by far the **largest UK retailer** of SuperBase, VizaStar and VizaWrite for the **Commodore 64**, for over **five years** we have supported the best software for all the **Commodore** business machines! So if you have a **CBM/PET 3000, 4000, 8000, 700** or **PC**, then don't forget us... we haven't forgotten you! Why not phone or write for our **CBM/PET catalogue?**

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All the features you'll ever need for **professional word processing**... and then more! Unrivalled **240-column** text handling, **variable width** screen, **word-wrap, cut-and-paste, four-way** scrolling, document linking for **unlimited capacity**, global **search-and-replace, help screen**, full memory **calculator**, row and column **arithmetic, menu** or **keyed** commands with **command strings, background printing**, complete **letter quality** print control, **spelling checker** with both UK and US **disk dictionaries**, comprehensive **four part** user manual...

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Your programs will really **take off** with **JetPack 64!** 100% compatible with CBM Basic, **Jetpack** compiles Basic programs into **machine code**, running up to **25 times** faster... using **up to half** as much memory! And it even accepts **Basic extensions** and **machine code** routines as well!

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Spreadsheet, database and **graphics** too... all integrated into one amazing package, at an amazingly **affordable** price! The very latest design techniques combine the ultimate in **ease-of-use** with all the sophistication of a fully **integrated** product... **VizaStar's** advanced features include **high speed** maths functions, large **1000** by **64** worksheet, programmability, windows, cell protection, search and sort, text editing, wordprocessor compatibility, simultaneous graphics... integrated with a **1000**-character per record **database**, up to **250** characters per field... the **only** product of its kind for the **Commodore 64!** Suits most printers, supplied with excellent handbook. (XL8 version now available with a **40% bigger** spreadsheet plus **business graphics**, ~~£129.95~~ £115.95!)

OUR PRICE (XL4) NOW ONLY £74.95!

VIZAWRITE 64

A **high-performance, low-cost** wordprocessor, with full **on-screen** formatting, that takes full advantage of the **colour, graphics** and **memory** capacity of the **Commodore 64**... that works with both **disk** and **tape**... and supports virtually **any** printer! With a concise and easy-to-follow user manual, **VizaWrite** is the **ultimate** personal computer word processor! (Available with **VizaSpell, a 30,000 word** disk dictionary and spelling-checker, for ~~£89.95~~ £85.00!)

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PAZAZZZZZzzz!

Producing your own theatrical performance on computer? Tony Lydeard finds limited results with Pazazz, while Julian Rosen doesn't fare much better with Screenplay.

Pazazz

You know those incredibly boring bits of animation that sometimes interrupt the loading of games? Quite clever first time you see them but a Pain in the bum when you have to sit through them time after time? (Super Huey is an example that springs to mind.) With Pazazz you can make your very own clever-but-boring bits to ensure that nobody ever again sits in the same room as you and your computer!

The blurb on the cover of this soporific, disk-only offering from Commodore promises the user the opportunity of directing and producing his or her own theatrical performance. In particular, it offers the facilities of designing scenery and costumes, writing music and choreographing the action. Whilst one cannot actually refute these claims, the reality is not quite up to National Theatre standards.

"Integrated package"

Pazazz is essentially an integrated Graphics, Music and Animation package. It enables you to draw a picture to use as a background for a figure to dance around in front of. The figure is "designed" separately by colouring in a person-shaped template. The animation section allows you to dictate a series of positions for the figure you have previously coloured in. The head, upper arms, forearms, torso, thighs, and shins can all be rotated and the figure itself can be positioned anywhere on the screen – when the sequence of positions (up to 1000) is played back, the figure appears to dance. The Music section allows you to string together a sequence of notes from 5 octaves. Two voices are available, each with a choice of four sounds. A synchronisation facility permits you to fit the movements to the music.

"Works beautifully"

It all works beautifully – although the controls used in the graphics sections are a little idiosyncratic. I had a lot of trouble remembering that the cursor down button scrolled the selection left and that the space bar actioned a command (sometimes – at other times, it was the return key). Some excellent results are possible with a liberal amount of patience.

Background, Figure, Movement sequence and Music are all saved to disk as separate files, making it possible to select different backgrounds or different figures for the same dance, for instance.

"Dreadfully boring"

Four scenarios are included on the program disk to illustrate what can be done with the program and very well put together they are too. The trouble is that what you end up with is so dreadfully boring. No matter how brilliantly the Background, Figure, Music and Dance sequence are designed, the combined result is a single figure dancing in front of a fixed scene. Andrew Lloyd-Webber has no need to feel threatened.

The disk is so heavily protected that it failed to load on a number of occasions. Needless to say, it produced the usual banging and thumping from my poor old 1541. The manual is up to normal Commodore standards – excellently produced and extremely thorough but difficult to find your way around. Overall, I find little to recommend.

Contact: Commodore UK, 1 Hunters Road, Weldon, Corby, Northants, NN7 1QX.

Screenplay

Screenplay, the latest offering by the educational software producers Macmillan Software, is a poor attempt at DIY computer animation.

According to the Blurb on the very eye – catching box, the contents will do no less than enable you to 'Make an exciting programme, just like the professionals!' Anticipation was the first thing to strike me as I opened the package, 'Could this really be possible on the poor Commodore?' I asked myself.

While waiting for the program to load I sat down and read the booklet they had so thoughtfully enclosed in the package. Almost two thirds of the booklet was dedicated to 'How the professionals do it'. In all fairness this part of the booklet gave a very interesting insight into the workings of television, animation, and the tricks that can be acomplished using both.

I was therefore waiting with baited breath for the program to load. After a few minutes the title screen appeared. Alas, fulfilment was not forthcoming. Never mind, thought I, trying with unequalled effort to summon up more enthusiasm than it actually deserved. So I progressed with, what later became apparent, were anything but well documented instructions.

"Icon controlled"

The program is controlled by ICONS, each representing an option. I couldn't help but feel grateful to the authors, as it soon dawned on me that the program was so complex to use that one had enough to worry about without a new command language to learn, or some other such delight many publishers seem to enjoy providing with their software.

After re-reading the instructions, and viewing the 'Demo' provided with the program, which only went further to make the program even more unappetising, I sat down to compose my own production.

"Not convincing"

I encountered many difficulties, which, to my mind, the authors could have expanded their documentation of quite considerably. Such areas as Sprite Design and Background were two of them.

After approximately one hour I was ready, for a few seconds of 'film' time. Now as an enthusiast of animation I can appreciate that much effort, time, and attention is put into a few seconds of film. But this was not film, just my humble micro, and to be honest nothing but film can really capture the true magic of animation.

Consequently, by piecing together numerous 'takes' as they have so originally called them, I wasted an hour on a few seconds of sprite movement, accompanied by some simple music played on one voice, and some scattered background hi-resolution sketchs, none of which were particularly convincing.

To summerise, Macmillan Software have tackled the decidly unmanagable task of 'DIY Animation' with the best results one could hope for. I could not recomend this product to anyone, basically because I feel it gives entirely the incorrect impession of what animation should be like. The booklet provided gives quite a detailed insight into the world of film, perhaps too much so, the complexities of the program were not aided by the briefness of the instructions. A verdict?, All that glitters is not as good as it may appear!

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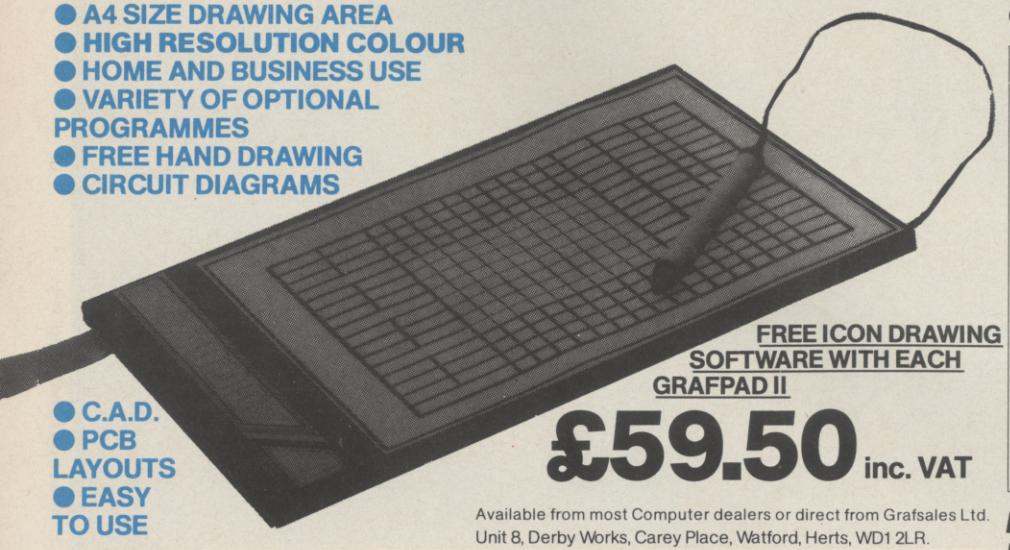

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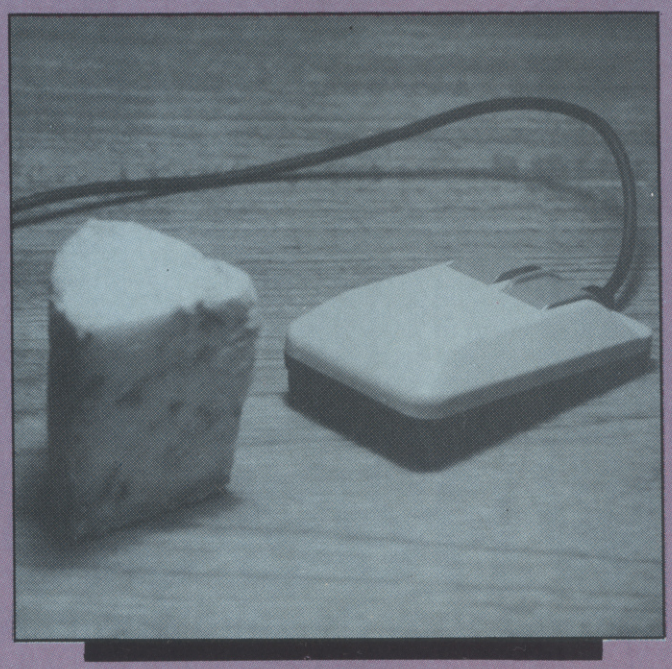
An Artistic Rodent

Say 'cheese' and you're looking at the latest graphics mouse. Tony Lydeard enthuses over its features and ease of use.

Just in case there is anyone left who doesn't know what a mouse is, it's a little gizmo which moves a cursor around the screen corresponding to its own movement around the table top. They have become inseparably associated with icon-operated software – a purpose for which they are ideally suited. Icons are little pictures on the screen. Moving the cursor the little picture activates that part of the program which icon illustrates.

The MS 2000 from Wigmore House is conveniently sized to fit the palm of the hand and is provided with 1.2 metres of flex – quite sufficient for its purpose. Its rubber-coated metal ball responded perfectly on all the surfaces I could think of and the push buttons have a good positive "click" to them. Cursor response is excellent.

The icons in "Cheese", the Graphics software that is supplied with the Wigmore mouse, are ranged along the bottom of the screen alongside two numbers which give the X and Y coordinates of the cursor position. The coordinates are reckoned from the top left hand corner of the drawing area and give a unique identification to each pixel available to the artist. The "canvas is 159 pixels across and 167 deep, with an additional 136 rows available by use of the scrolling function.



"Icon-driven"

The first group of three icons depict a cat's head to represent the Undo function (i.e. cancels the most recent operation), a regular pattern (one of 32 available) which is used in the various Fill functions, and a rabbit's head. The latter cycles three sets of seven icons in the adjacent group. When a function is actually being used, the group of seven icons is replaced by a colour grid and either an inkpot or a pencil, the colour of which determines that of the trace or cursor respectively (the aforementioned rabbit's head is replaced by the icon of the function in use).

As with most Graphics software, there is the facility to draw freehand in a variety of thicknesses and textures of line. The degree of control when trying to do this with a joystick is minimal, as anyone who has tried will testify. With the MS 2000 it's a doddle – you just write or draw on the table and the mouse transfers your efforts directly to the screen. A minor niggle here – the MS 2000 uses an area of just 50mm x 45mm to deal with the available screen area. I would personally have preferred slightly less sensitivity.

There are also the normal line and rectangle functions, the latter utilising the "rubber band technique of defining the opposing corners. The circle function is a little unusual in that it is really an ellipse function – you define the centre of the ellipse and then the major and minor axes with a "rubber band. If you want a circle you have to make sure that the rectangle is a square – if you see what I mean!

"Ellipse function"

Cheese does not have the "ray" function that some programs offer but then it doesn't really need it as the starting point's coordinates can be memorised.

Interesting features include a Reverse facility, which enables predetermined areas of the screen to be "flopped", either laterally or longitudinally; a Mirror function, which reflects your drawing in the other half of the screen as you draw (the "other half of the screen" can be defined in any four ways, which can be used simultaneously if required); a Copy function, which enables a predefined rectangular area of the screen to be reproduced, and a Tile pattern. The tile feature enables areas of the screen to be filled with one of 32 different repeated patterns (my second minor niggle comes in here – if you overshoot the pattern you want, you have to cycle through all 32 again as there is no reverse).

Your works of art can be saved to disk or tape, depending on which version you obtain or printed out on a Commodore printer. Both worked well although I could have done with a few more disk functions. The copy I have been using was a preproduction one adapted from the version, so perhaps the version will have improved.

"Good value"

At £64.50 for the tape version or £69.00 for disk, MS2000 isn't cheap. To my mind, however, it is good value. The hardware, as I mentioned earlier, is sturdy and reliable. The ball can be removed for cleaning, which is a sensible feature. The software is simply the best graphics package I have come across. The word-processed manual leaves a lot to be desired but it does explain how to work the thing. The only serious shortcoming I found was the lack of information on how to incorporate mouse control into your own programs or to use your illustrations indepently of the generating software.

If you're saving up for a Graphics package, I would strongly recommend saving a little longer in order to get your hands on the Wigmore mouse – it's triffic!

Contact: Wigmore House Ltd., 32 Savile Row, London W1X 1AG. Tel 01-734 0173.

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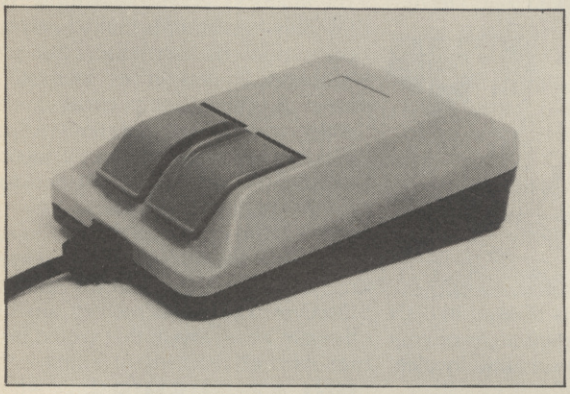

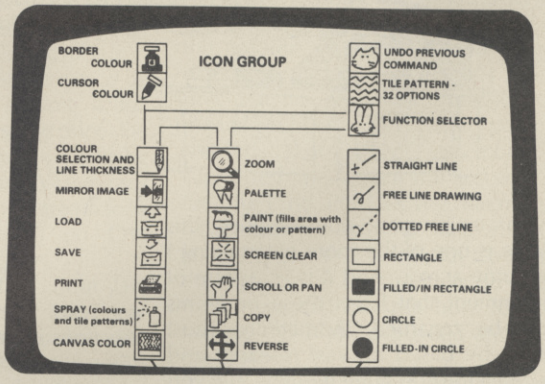

The MS 2000 is a beautifully designed peripheral used to move the cursor simply and quickly around the screen like a drawing pen, paint brush or air spray. This popular device is so natural and friendly to use that it will add an exhilerating new dimension to creative art, CAD, design and business drawings such as graphs, pi charts and plans. Full 16 colour simultaneous drawing and painting facility.

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The Real You?

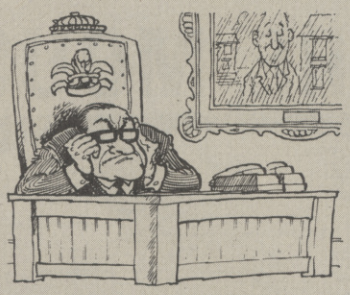
Ever wondered who and what you really are? Now is your chance to find out with this program 'based on major tests'. Sue Pearce investigates

"Only you need know how odd you are", states the introductory blurb to this package. How reassuring!

The 'privacy' offered by the computer is often one of the biggest selling points of programs which promise revealing information about yourself as a result of sometimes intimate questions. The thinking behind it is that the user will give a more honest answer to questions if there is no-one to see the results but themselves.

However, do people really regard the results dished up by computer as gospel? How many people want to find 'the real you'?

SATISFACTION
(Are you satisfied with your job?)



As far as program content goes, this package is one of the more entertaining I have come across. And it is as a form of entertainment that I feel these programs should be regarded. Admittedly, most claim to be based on vast research and tests, but if the computer tells you that you are compatible with that partner you have been so happy with for the last 10 years, I wouldn't leave them as a result!

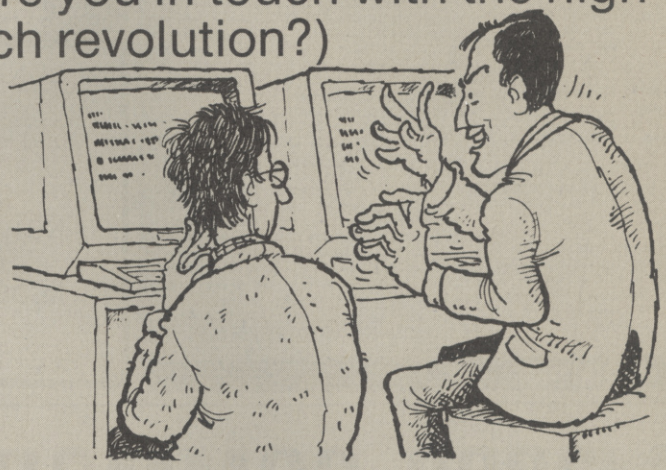
The Real You contains 16 tests taken from a Dr Michael Nathenson's The Book of Tests. The program is divided into six sections covering important areas of your life: work, intellect, personality, lovelife, anxiety and views.

Each section is made up of a series of questions. The screen display for each question is made up of two or three windows. The top window contains an instruction on how to answer each question. The central window contains the question or picture, and the lower window contains the responses from which you are must make your selection. You respond to each question via the cursor keys or a joystick, whichever is your preference.

A score is displayed in the form of a bar on a scale on completion of each test. This shows the minimum and maximum scores possible and your score as compared to the population in general. It's then back to the book to read the analysis.

BODY
(Are you satisfied with your body?)

HI-TECH
(Are you in touch with the high-tech revolution?)



STRESS
(How much stress do you have in your life?)

If you enjoy this type of program then The Real You is certainly worth looking at. My only hesitation is that when you have completed the tests once the program becomes limited in its interest. That's assuming you don't cheat and enter different responses each time. Admittedly you can test yourself against friends and relations – but will you want them to know the details of your sex life?

So, at the end of all these tasks (and an enjoyable afternoon trying to prevent the rest of CCI peering over my shoulders to discover my sordid secrets) am I who I thought I was...well, that would be telling wouldn't it?!

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(Are you and your partner likely to succeed?)

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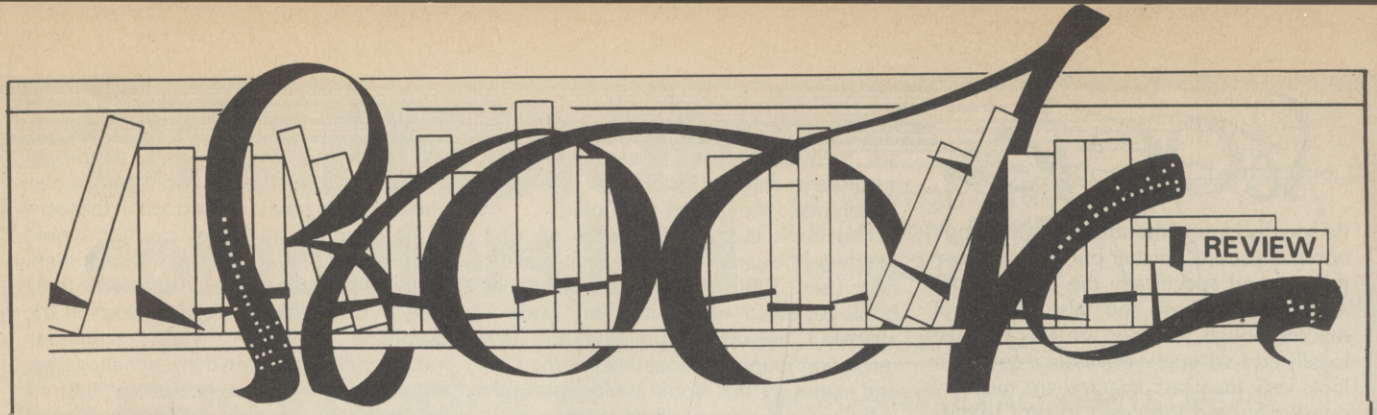

THE OFFICIAL GUIDE TO OXFORD PASCAL, by I Sinclair – £7.95

PASCAL is a very popular language with the professional programmers as well as the universities of this country. Very few people at this level bother with BASIC and a working knowledge of PASCAL is necessary if you wish to aspire to a career as a programmer or just collect a degree in computer science. The main value of PASCAL lies in the technique of how programs are built as well as the ease of portability across to other machines. PASCAL is highly structured and I must admit from personal experience the spaghetti-like nature of BASIC is very frustrating to take at times, particularly when trying to follow a BASIC program written by someone else. It is difficult to leave an imprint of personal programming style with PASCAL as opposed to BASIC, but in general I avoid BASIC whenever possible.

I am a long time fan of COMAL which shares the best features of PASCAL and BASIC and I would recommend this as a convenient route to PASCAL. In fact, given my way I would like to see the end of BASIC as the de facto standard – certainly as far as Commodore machines are concerned – and replaced by COMAL. It may be the fate of the Jupiter ACE that puts manufacturers off from implementing another resident language, (the ACE took the brave step of using FORTH as resident which really was a little over the top).

One of my interests in personal computers extends to programming languages and although I would freely confess to weaknesses in some languages, I do enjoy having a dabble whenever possible. I have always liked Oxford PASCAL since it is the most accurate implementation for the C64, the only limits being the hardware in terms of memory or disk access speeds. Nevertheless if you are serious about acquiring programming skills then PASCAL is worth learning. The only shortcoming of Oxford PASCAL is the supplied literature in the form of a booklet, which was very light on the subject. Yet this fault could not be laid at the door of Oxford Computer Systems Software Ltd, since they are mere suppliers of compilers and not language teachers. So, having bought your Oxford PASCAL compiler there was an immediate need for a book on three important aspects; one, learning how to fully use the compiler itself, secondly, how it works in terms of the features of the C64 and thirdly, a practical introduction to PASCAL.

Ian Sinclair is prolific writer and I have always found his works to be very readable. I fear though that in this book he has attempted to cover too much ground. He has made a major effort to cover everything commencing with a 'how-to' approach to programming in PASCAL and really leaving the most useful matters until the final chapter which is entitled "Assortment". The author takes the reader through the various nuiances of PASCAL such as procedures, types and string handling before skimming lightly over the surface of the C64's sound and graphics abilities.

Admittedly one of the strengths of PASCAL lies in its portability between machines, although at the C64 level it is unlikely that someone will want to use this machine as a vehicle for PASCAL software development. What I would have really liked to have seen is more and longer PASCAL programs, rather than the short and simple ones in the book. Maybe Ian has another volume up his sleeve which will assume PASCAL literacy and concentrate on the features of the C64. He does make it clear in this book that one of his aims is the coverage of features suitable to most readers, so perhaps my thoughts are those of the minority.

This book is certainly worth buying if you have purchased Oxford PASCAL already, for whilst the manual supplied by Oxford with the compiler is adequate, it would be unfair and unrealistic to assume a full blown tutorial on PASCAL for the price you have paid to Oxford. It really should be regarded as a continuation of the user manual, so we wait with bated breath for a definitive programming book on C64 PASCAL.

The book itself consists of about 160 pages which breaks down into nine chapters, an appendix and index. No complaints bout the typesetting or general quality of this book, although the price seems to be slightly in excess of what I would like in terms of the total number of pages. Recommended.

COMMODORE 64 ASSEMBLY LANGUAGE ARCADE GAME PROGRAMMING, by S Bress – £14.20

It has long been accepted that to produce reasonable games on the C64 which use the full features of the machine, the programmer has to resort to assembly language. The principle reason being speed of execution since a game contains many elements, sound, graphics and arithmetic functions all of which can be done using BASIC but which would take hours to fulfill. Another route using a compiled language such as PASCAL or the halfway houses of FORTH or COMAL. Probably FORTH is the next best choice to assembly language and this is the approach taken by Oasis Software in their excellent 'White Lightning' package. Quite why assembly language causes so much fear amongst users is a mystery to me; yes it looks difficult but, like riding a bicycle the hardest part is actually starting off.

This book uses the technique which is now common in a lot of programming books originating from the USA. The listings are provided in pure assembly language for those users who have a assembler, hex dumps for monitors only and BASIC loaders for the poverty stricken. The last two methods are not really serious options unless you are a demon keyboard operator and have plenty of time. The book however is essentially assembler orientated and specifically the Commodore Macro Assembler Development System. The reason for this becomes apparent on delving further into the text, the programs make great use of macros to speed things up and cut down the amount of typing. If your assembler does not support macros this does not preclude the programs entirely, but just means repetition. I was particularly pleased that CBM assembler was supported, apart from the fact that this is the one I use and like, the macro options have always been a little mystifying, courtesy of the ever helpful Commodore documentation. I understood how a macro worked but not how to use the facility, this book explained and showed me how.

Don't run away with the idea that this book will turn into a Crowther or Minter clone overnight, it won't. What it will show you are the elements of constructing arcade games. The sound and graphic features of the C64 are covered relatively well and with the help of other source books you should come up with something that will at least impress the family and friends. The magic ingredient of originality is left up to you and the mechanics of how the C64 operates such as bank-switching, raster interrupts and other machine dependant properties are well covered.

The book provides the purchaser with a very useful macro library of routines which, although directed towards games are food for thought in terms of utilities.

Personally I found the strength of this book not in the subject matter but in how to use macros and specifically the Commodore Assembler. Beware the false beauty of macros though, variables are only effective locally and although your source code can look very lean fast, macros are memory consuming and this need to be carefully watched in size restricted areas such as that old favourite, the cassette buffer.

As well as providing a full listing of two arcade games for the patient reader to type in, there is also a full discussion of another of one of my favourite tools, the Koala Pad. The book includes unpublished details on Koala graphics such as relocating the high resolution screen and file transfer, both into and out of Koala screens. Very useful.

My only complaint about this book was the program listings have not been typeset and are left in dot-matrix. It happens that the printer used by the author looks as if a new ribbon would have been helpful but the book publishers have to offset legibility with the program accuracy and I'm all in favour of the latter. For 260 pages, the book is value for money. Recommended.

COMMODORE 64 COLOR GRAPHICS: AN ADVANCED GUIDE, by Shaffer – £14.50

The title of this book was a little ambiguous in the use of the word Advanced, but so many books now use this ploy in order to sell themselves that I always view with suspicion the inclusion in the title 'Reference', 'Advanced' or 'Guide'.

The book is part of a series on C64 graphics, the earlier on being pitched at the new user. Similar to the arcade games book reviewed earlier machine code is almost a must when utilising the high resolution graphics capabilities of the C64 and curiously this book avoids assembly language, apart from a listing in Appendix D, and the programs are entered as BASIC data statements. If there is one thing more boring than waiting for a cassette to load, then it must be keyboard entry of ream after ream of data statement numbers. I certainly find keying in an assembly language program provides a lot more interest than keying just pure numbers, even when I don't understand the function of the program. I am sure that a lot of young, potential machine code programmers never progress beyond BASIC because they imagine assembly language consists purely of bare numbers, and who can blame them.

Where this book did prove interesting was in the explanations of the mathematics of object rotation. I don't know about you but I have grown rather tired of graphics books that provide grid designs of aliens, monsters and other general science fiction pap. Exploring the ins and outs of polar and cartesian geometry is not my idea of a happy pastime, but like most aspects of mathematics, put it into a frame of reference that is relevant to the reader and yes it immediately becomes of use and value.

Even more interesting was the all-to-brief exposition on colours and how to use them. At this point I should admit that on a scale of artistic ability my position would be the next one up from matchstick men. Before the C64 came into my life the thing that I could draw well were cards in the gambling schools whilst attending polytechnic, and even then, not altogether too consistantly! The concepts of contrast in using different colours was completely new to me and provided some fresh ideas in this vein.

I found the programs within this book were to a high standard and although they worked very well at a definite level of user-literacy certainly not that suggested by the title. In fact I have a sneaking idea that there is another book yet to come. In one sense the book was insipid; looked at another way, there was some new material, not so much connected with the C64, but with the fundamentals of graphic art. This book really stumped me for a recommendation, since it falls between the two stools of the machine and the subject. I fear that there is little more to be uncovered and wirtten about in terms of the C64 hardware facilities but there is a need for a book dealing with the day-to-day applications of the C64's graphical abilities. This book went forward a little in the direction of the latter; I would like to see more. The use of only two printed colours was restrictive bearing in mind the price, although there are 310 pages. Examine the contents of this book carefully before you decide.

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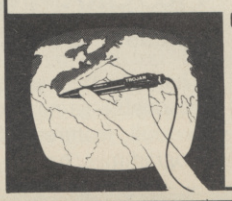

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Below are four easy questions to answer. If you haven't seen the film, the TV series or read the books (where have you been, and do you know what you're missing?), you may well find some clues in the Max Headroom feature on page 28.

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1st: Two Max-packs of the video; Max Headroom's Guide To Life; Max Headroom – the book of the film; and the game.

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Prizes will be awarded to the senders of the first five correct entries pulled out of our competition sack. The closing date is 7 March 1986. If you do not wish to cut up your copy of CCI, please feel free to send us a photocopy of the completed competition page. Send your entries to:

Max Headroom Competition,
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Finsbury Business Centre,
40 Bowling Green Lane,
London EX1R ONE

Please answer the following questions:

1 What is Max Headroom?
A _____

2 How did Max get his name in the film?
A _____

3 Which TV station spawned Max?
A _____

4 Which TV station gave Max his first big break?
A _____

Name _____
Age _____
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Win The Game

You've read our film review, been treated to a glimpse of the future with our game preview...now enter our Back To The Future competition!

From the sneak preview that CCI was allowed, the Back To The Future game looks like being truly AWESOME. We are giving you the chance to win one of 10 free copies of the game, PLUS a glamorous CCI T-Shirt.

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Our photograph shows inventor Doc Brown in a situation he would probably rather not be in.

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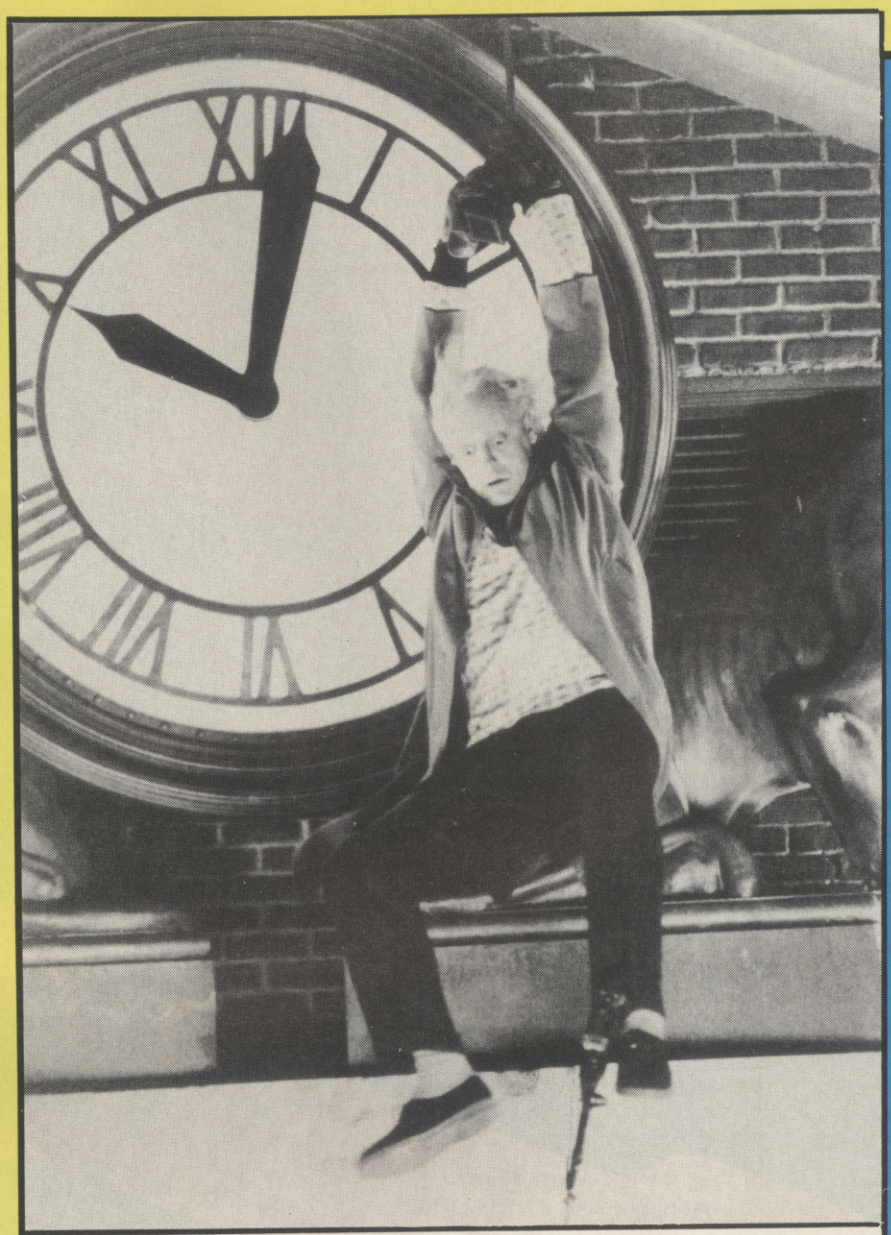

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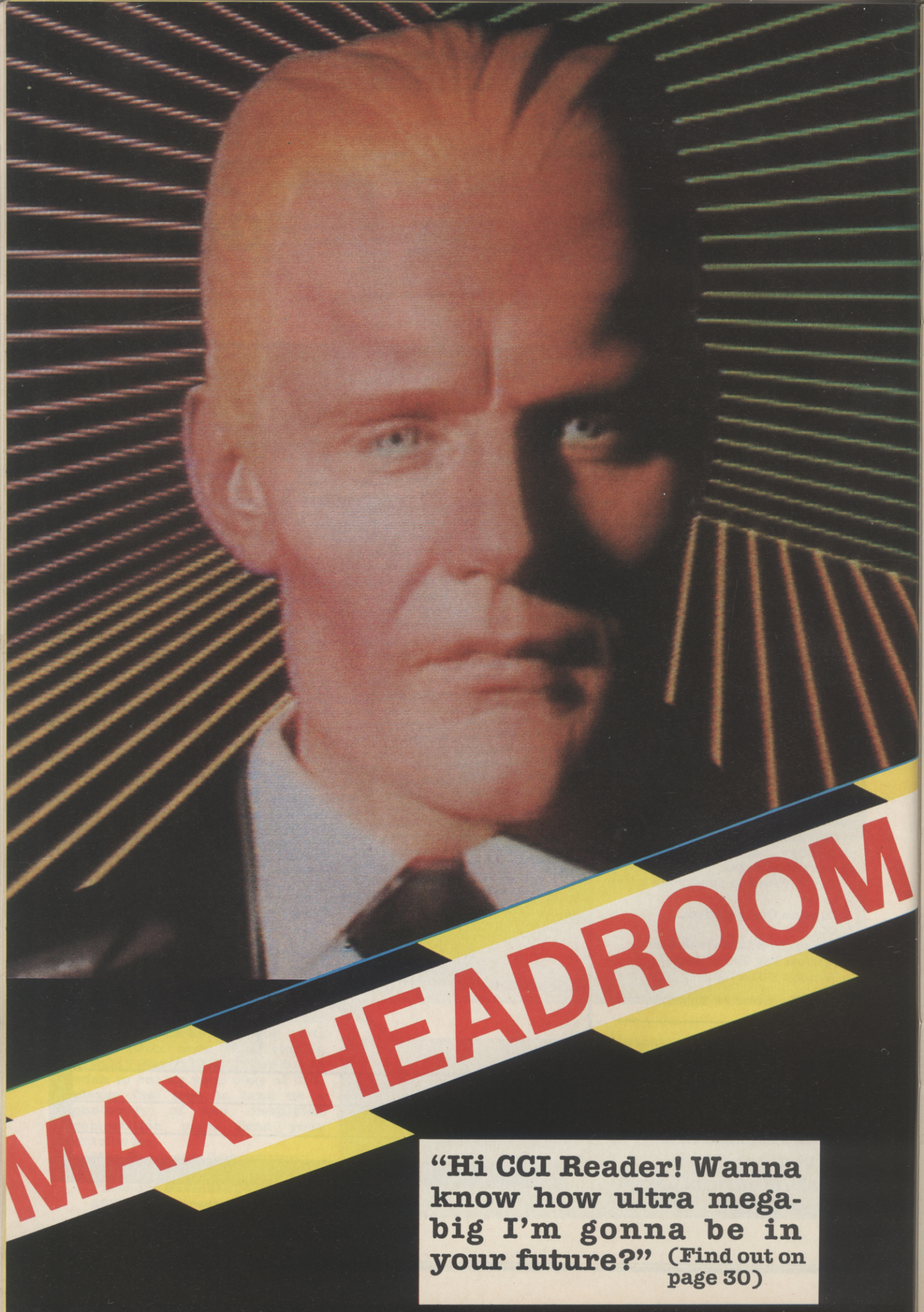

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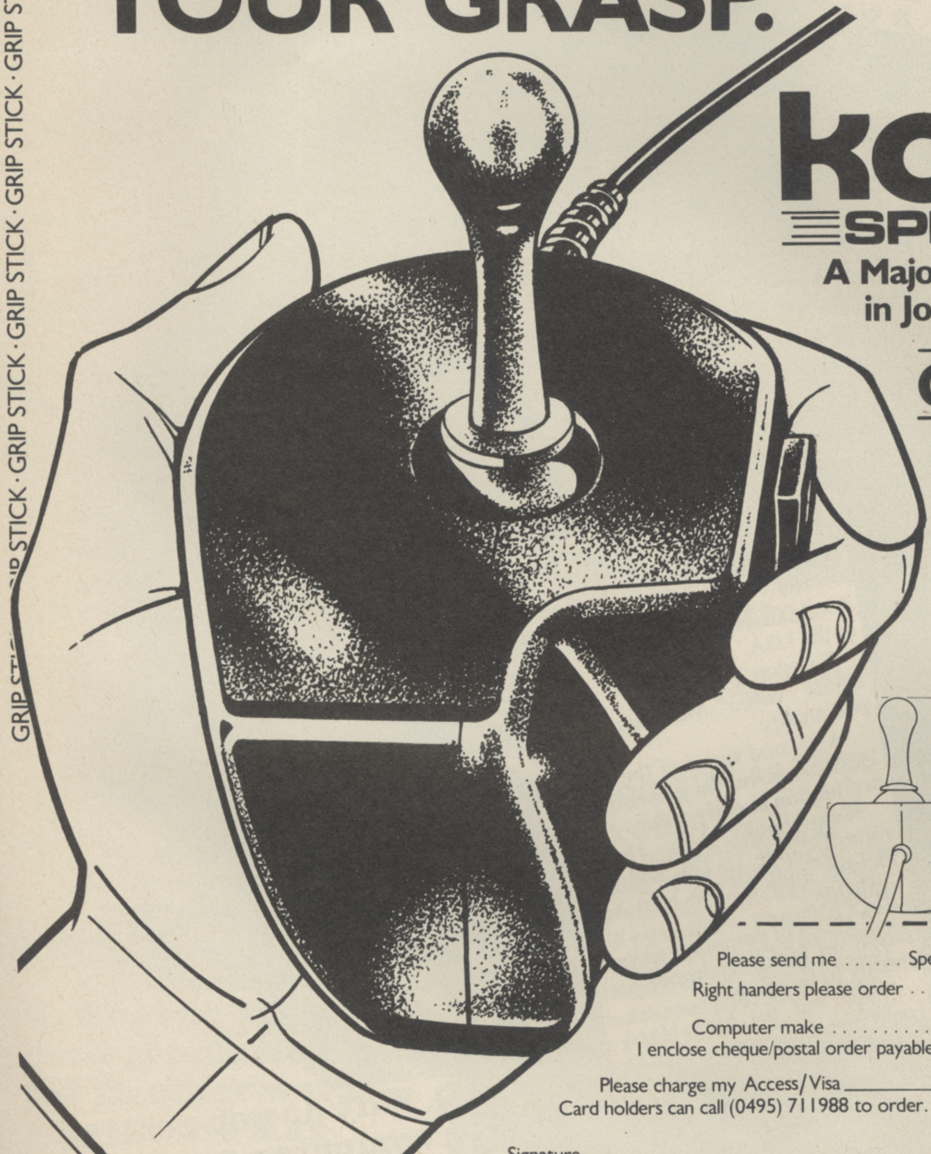

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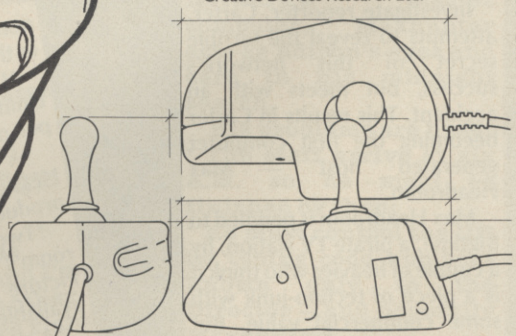

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Max Headroom is the world's first computer-generated television personality. He was created as a result of a request from Channel 4 for a programme to showcase the best of rock and pop videos. The concept of computer-generated graphics whith a human voice-over to provide the links between video clips was developed. From this original concept came Max Headroom, the computer-generated TV host.

The idea met with much enthusiasm at Channel 4. But who was Max? A personality and history were required. This problem was solved with the commissioning of a film of a one-hour drama telling the story of the creation of Max Headroom and his emergence as the presenter of a 24 hours a day rock video show. The scene was set for the Max Headroom Show series.

"Max is an image whose time has come – the perfect television presenter. No temperamental outbursts, no hangovers, no holidays, no salary. Constant, 24 hours a day."

A. Is Ma
your rea
not have
for chan
there a
in your

Q. Yes, no an
if you want to
change them
actually, I ke
just did a qui
Michael Hes
wants to swa
strutting aro
for anybody.

Max Headroom – the Film

Max Headroom is set 20 minutes into the future in a world where television is the only growth industry.

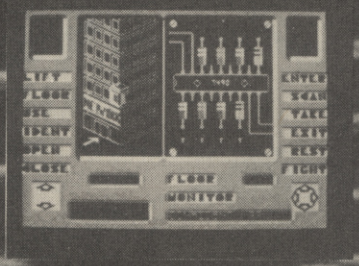
TV networks battle for top ratings. Network 23 the top-rating network, mainly due to compressed TV commercials called Blipverts. These happen so fast they are embedded in the viewer's mind before they can switch channels, but they have an appalling side-effect.

Investigate reporter, Carter, attempts to reveal the terrible secret of this network's success, but meets with an accident. This results in Carter becoming the first computer generated host – Max Headroom.

Max Headroom is peddled to Bigtime, a pirate TV station, by a couple of heavies who think it is a piece of techno-junk with some commercial value. But the 'Max Box' sends Bigtime's ratings soaring.

Not everyone is as thrilled and descend on Bigtime...

"Max Headroom has developed into a truly international multi-media personality. He is to television what Coca-Cola is to soft drinks and McDonalds is to fast food. Max has one thing in common with almost every person in the Western World. They watch TV. Max is TV."



Achievements of Max Headroom

*The film has been nominated for two ACE awards in the USA.

*London magazine City Limits voted Max top TV personality.

*A second series of the Max Headroom Show is planned for production in early 1986.

*Two books, Max Headroom's Guide To Life and the Picture Book of the Film are available.

*A series of computer games based on Max Headroom are shortly to be released.

*Look out for Max Headroom merchandising.

Q. Why do you act like a computer-generated thing when you are really a human?

A. You're very kind. The more people that take me for a human, the more I shal impr-impr-impr-get better. That's what I "think".

Max Headroom real name? If ave you a reason anging it? Is a guilty secret ur past?

o and no in that order, but nt to sell more copies you hem round a bit. No I kept the initials and quiet name-swap with Heseltine. I think he swap back but I'm not around in a flak-jacket ody.

Q. Can you get "high" on voltage charges? How much room is there in your electronic world?

A. I wish I had an electronic world, there's so little room in the studio, if I smile too broadly someone has to open the door! An, comedy – I can't resist it! About voltage, a very funny and frightening thing happened before my first show – pity, I've no time to tell you about it.

Q. Do you play computer games?

A. Of course not, it's not much fun playing with yourself, and it's boring to win all the time.

Q. Who programmed you?

A. Originally the producer, but now I'm almost completely self-programming, and I'm about to become the first ever computer-generated-producer/writer/performer – you wait and see the difference when it happens!

Q. As a computer generated screen image, admittedly a highly charismatic one, do you feel you are inferior or superior to humans?

A. Humans are a very special breed aren't they – good and bad, and I know some (my ex-producer included) who are really nasty little breeders! Ah, more jokes – if only my all-too-human writers could come up with things like that. But no, I feel superior to my public I'm simply content that they look up to me as they do.

Q. Is there a Mini Headroom?

A. I don't know, try the Teletext service.

Q. Who/what is Max Headroom?

A. A lot of people see me as something very special and I'm humble enough to accept other people's opinion – they're right. I was brought on to the networks to give them a little more pezazz, fizz, razzamatazz, and other words with lots of Zs in them.

Q. What do you put your popularity down to? In other words, what is the Max Factor?

A. Well it's not doing jokes like that. My popularity comes down to my very high degree of perfection, plus a strong element of modesty.

Max Headroom

Edison Carter's nose is itching! Network 23's ace reporter always has trouble with his nasal passages when a story doesn't quite add up. His sixth sense leads him to Network 23's tower block and his intuition points to floor 203 – the computer lab.

Max Headroom is the name on everyone's lips and Edison, helped by Theora, his controller, is hot on the trail of the black box which holds the Max Personality Generator.

Theora's 'Maxhunter' computer program is the only help Edison is likely to find. Linked to the Network's master computer, Maxhunter acts as Edison's eyes and ears in his midnight search.

His problems are huge;

* The staff arrive at six A.M. so he must be finished by then;
* He must control the lift by typing code numbers known only to the Director – and hopefully Maxhunter!
* Scores of security guards, two hired assassins and Bryce, the evil hacker who invented Max, all have vested interests in Edison's destruction.

Only you can help Edison to complete is quest.

Released at the end of February 1986, on the Commodore 64, Spectrum and Amstrad, A Quicksilva program with a recommended retail price of £9.95.

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Mega-Review

MEGA

URIDIUM

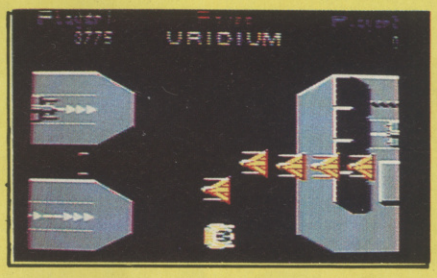
In the last year, Andrew Braybrook has received a deserved amount of praise and attention for the products he has released; none more so than his previous game; Paradroid.

In my view Paradroid was one of the best games of 1985, and his first release of 1986 – Uridium – would have had to be really special to live up to it's predecessor. Unfortunately it doesn't.

Uridium is just not quite as original an idea, even if the execution is just superb. The graphics are excellent with the same pseudo 3-D land underneath your ship, and a really nice touch when you perform a 180 degree spin.

The most noticable thing about Uridium – hailed officially as the sequel to Paradroid – is that it really is little more than a really good shoot-em-up. This is not putting the game down, far from it. I think the game is excellent and have played it for hours, but with a little more care it should have been even better.

Musically Uridium is also good, and the effects (especially when put through a stereo) are really arcade-like. When it comes down to it there are not that many really good shoot-em-ups being released at the moment, and Uridium shows how far that basic idea can be taken.



Price	£8.95 cassette £12.95 disk
Graphics	****
Sound	****
Playability	***
CCI Rating	MEGA

Contact: Hewson, Hewson House, 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX. Tel: 0235 832939.

IFFY

MOEBIUS

MOEBIUS

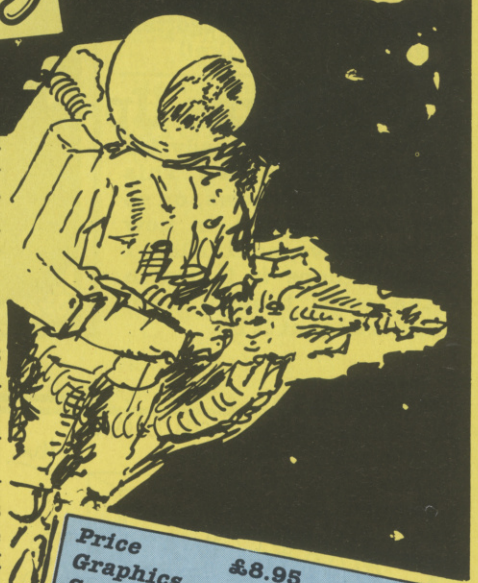
A new company's first product is usually the one which people judge the rest of their releases by. If it's appalling it becomes increasingly difficult to stem the downward tide. If, however, it's excellent, everything else falls nicely into place.

Moebius from Infinate is a game which will be a lot of different things to different people. It comes attractively packaged in a twin cassette box, and on loading it immediately looks as if a lot of care has been taken over the game.

You play – surprise surprise – Moebius, the "legendary mercenary". You must battle your way through various 'planets' in order to eventually reach the Controller who you must destroy.

With various scanners to ease your task, you fly your jet-pac-esque transport around the planet killing everything in sight, and using various shelters to hide from the marauding robots and minotaurs (eh? In space??).

Moebius is graphically very pretty, although it certainly owes a lot to the Ultimate Jet-Pac range of games. Sound too is good, but I seem to get a certain feeling that tells me the beauty of this game is only skin-deep.



Price	£8.95
Graphics	***
Sound	***
Playability	***
CCI Rating	IFFY

Contact: Infinite Games Ltd, Suite 23, 36 Hathersage Road, Manchester.

Felix Says....

Having fought my way out of a certain persons 501's I am here to give you details and gossip on games, people, and general happenings at this time of year.

3 Times Evading

After changing the name of their latest release from Twister, Mother of Harlots, to plain Twister, to avoid a repitition of PCW's 'Bad Taste' comments, System 3 also seemed to have moved to new premises – although where these are is not quite certain. If Mark Kale reads this maybe he could contact me, I'd love to see a finished System 3 game, I've forgotten what they look like!!

Mud Owns Up

Mud should be ready for launch on March 1. This is the latest news, or so I'm told. As it is now nearly five months late I really hope it is worth the wait, though I am assured that it is!

Santa Claus is coming to Town

Although it is a little after the festive season I thought you'd all be dying to know which member of a large software house insists on wearing Father Christmas boxer shorts!! Information has reached me, from people who assure me are CLOSE friends (too close if you ask me!), that a certain Andrew Wright from Activision is the culprit – but then coming from Croydon, that doesn't surprise me!

Why are we waiting

Orpheus win this month's award for the longest wait for an 'imminent release'. The Young Ones was first seen at the PCW show, in demo form, and since then I have been told various reasons for its delay, but surely the post cannot take three weeks? I do hope we see it soon!

First Amiga Game

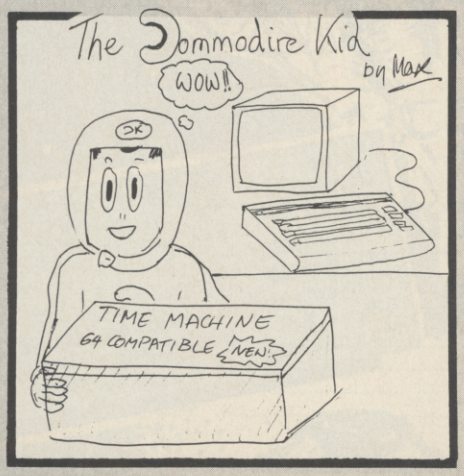
Psygonsis, of Liverpool can claim to be the first people to release a game for the Amiga. Brattacus, a conversion from the QL and Atari St is to be released almost immediately, and as such should corner what little market there is!

Yak Returns

With the Hairy One having gone skiing for a couple of weeks with Tony Crowther I am glad to report that all the gossip about these two programmers is totally unfounded. From what I hear they got on like a proverbial house on fire. Does this mean we'll be getting a Locomotive Llama?? Who knows??

Ear Today!!!

News has arrived to me that a certain games player somewhere in Ludlow has been listening to games too loud, thereby causing a severe case of 'Earache'. I do hope he recovers soon!



Sweden recovers from loss of Abba

A new software company, Greve Graphics, recently wrote to me with news of their game 'Soldier One'. I haven't a clue what it's about as they failed to send any details whatsoever, but they did send a picture of their chief programmer; Bengt 'the dog' Caroli.

If you saw the picture, his nickname would be self explanitary – hound or what!!!

Raiders Returns

Great news for all who like a good blast is that Star Raiders II, the sequel to the original super-classic, is to be released on the 64 in the not too distant future. My big worry was that they would have lost the original's brilliance, but much to my relief, having seen the Atari 520st demo, I can assure you that if the 64 version is half as good – it should be totally AWESOME!!!

World Domination?

Not content with being the largest supplier of games software in England, US Gold have now set up an international contract with Ultimate meaning they will manufacture, distribute, and market all of Ultimates future releases.

Although it's a bit sad to see one of the most renowned English software houses get swallowed up like this, hopefully it will mean that Ultimate start producing decent software again. With Dragon Skulle scheduled for release in Jnauary (though who knows when we'll see it?) we ought to find out soon whether the quality has improved.

As well as Ultimate, US Gold are thought to be signing a contract with Adventure International shortly, which would involve releasing titles under their 'All American Adventures' label.

Rumours of US Gold bid for Cuba are vehemently denied!

Bouncing Bounder

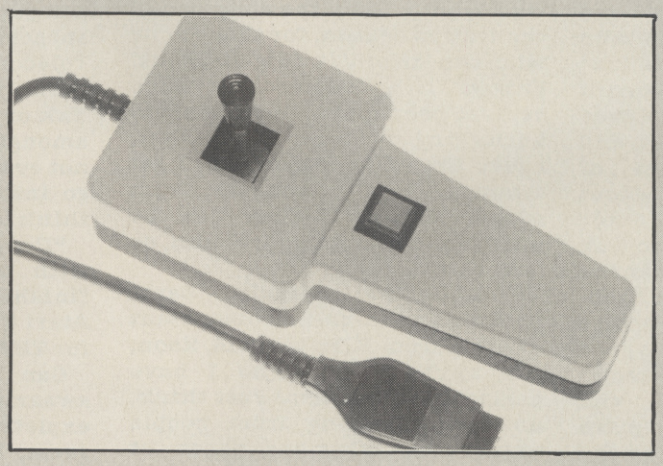
Although I managed to avoid getting it in this issue, due mainly to my total incompetance, Gremlin have recently announced Bounder. The game is totally brilliant, no question. It lacks for nothing – bar a Rob Hubbard soundtrack! The graphics are great and the game is one that is totally irresistable. I promise a full review next month.

That's all for this month, except say that I'll try to get out again next month, it get's really horrible down here sometimes!!!! Bye from 'The Worlds Most Famous Cat' FELIX!

Revs Stick

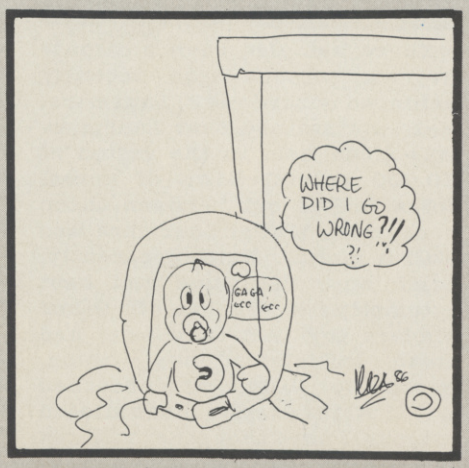
Newest joystick this month is one designed specifically to work with the new game from Firebird, REVS. As such it is an analogue joystick with no self centering. In use it proved very good, as long as you had time enough to get used to it!

For more details contact Meedmore Distribution on 051 521 2202.



STOP PRESS

The Force will shortly be with us! That's the name of a new game shortly to be released by Mind Games. It was written with the consent – and in fact co-operation of Scotland Yard! See next issue for yet another CCI exclusive.



Narrow Road Between Lands

Hello again Mudders! These last couple of months have been full of arguments, quarrels and rows on MUD, mainly over matters arising from the new Arch-Wizards. Most of them have been of a good hearted nature, with nobody outside those concerned affected, and the disputes settled amiably and peacefully, but there has been the odd exception. Brian the Arch-Wiz has stated quite catagorically that if he finds ANY wizards messing around with the mortals, then he will FOD (Finger Of Death, ex-persona. Basically, your persona is permanently wiped out of existence when a wizard does this to you!) them and possibly have them removed from wizard status. I personally think that this is a rather hard line to take, as part of the fun of being a wizard is the ability to torment, tease, and make fun of those mortals who once used to be your 'fellow' players (On reaching wizard rank, most people try to distance themselves from the mortals, and try to develop an aura of 'mystique' and magic about themselves). Several other wizards have also objected to this ruling in no light-hearted manner either! HEhehe.... Kate the Arch-Witch has said that she supports Brian's view. I suppose it is a good rule, so long as it is not applied to every case of teasing and tormenting that mortals complain about, to try to get back at the wizards!

Killer Wiz

There has also been a dispute over a persona who recently achieved wizard rank, Laurmara. Kate maintained that Laurmara was given help in the region of 30,000 points! Bolts of verbal force lashed out between those concerned. Whilst Laurmara was still a mortal, Kate, apparently, came onto the game and kept attempting to kill her off. Other players say that they have had this inflicted upon them, especially Jilly, who reached witch status despite these alleged attacks. I hope that other wizards are not doing this, because it really puts people off the game.

I have had several complaints sent to me about a wiz – and he shall remain nameless – who has allegedly been coming on as a mortal and killing players off. Please, stop this slightly infantile behaviour. I know that this is acceptable on Essex MUD, where the game is open to all, but on Compunet, which is a commercial system, people who are killed off by wizards who are just feeling malicious at the time rarely return to play the game again, which is obviously a great shame.

Heavy Usage

I mentioned a while back that since the reduction in playing time costs came into play (£1.75/hour), MUD usage shot up. Well, following this, usage dropped for a while, but luckily the approach of the festive season, for those of us who can afford it (dig-dig Zark! Snigger.....), seemed to have revived people and people seem to be logging on more often. Now, every time I log onto MUD, I get swamped with requests from people asking if they can be mentioned in my next column, so here goes.....

HELLO TO: Spindle, Zark, Bridrin (ahhh-no more constant nagging from HIM!), David, Zeon, and anybody else who I have neglected to mention! Just think, no more hassling from people wanting a mention; peace at last.....Hehehe

Over Christmas many of you will have had the message 'Account-User Maximum exceeded-please try again later' (or words to that effect) appear when you are trying to log on. This is due to very heavy usage, because of the holidays. In the reasonably near-future, this message will appear very rarely, as Compunet are all set to execute vast improvements to the system. The code has already been re-written several times, so increasing capacity and speed considerably. So if you are on one night, desperately trying to get somewhere in the game, but can't because of the speed, don't fret because soon, all will be well.

Rumour has it that MUSE and Level 9, the renowned British s/w adventure house, are collaborating to produce an adventure of Infocomic (not sure about that word...hmmmmm!) proportions. This should result in a very high quality game with regard to the prose, and certainly a very good adventure, if this rumour has any substance to it! More on this....possibly....next month.

My pleas have been noticed I see! When I entered Valley a few days after the last article appeared, there were actually a few people playing it! I felt I had to see if they were real or not, and so tried talking to them and lo and behold, they really WERE real. Thank Wizard for that! Hehehe

A 'reputable' magazine recently stated that they had several computer celebreties holding subscriptions to British Telecom's M.U.D, and amongst them, they said, was Old Hairy Yak or Minter to the uninnitated amongst you, he says that he has not even been approached by BT to go into M.U.D. He doesn't really think it's his kind of game.

"I've got less violent things to do with my time", he says, "like finishing Colourspace on the Atari ST and the Amiga". So much for THAT 'fact'!

Can we please have less swearing on MUD? The odd, mild expletive adds flavour to the game, but some people are just going over the top. In future, anybody heard swearing will be FODDED! So beware all you foulmouths out there! Also, a word of advice, don't start shouting or swearing (however mild!) at a wizard. You will place yourself in mortal danger.....

There are a lot of low-level mortals about, but only a couple of really high ranking personas. We won't get many more wizards at this rate! Come on, get a move on!

Well, I'm off now to go MUdding and snoop on a few players! Hehehe catch you next month!

----*Zaphod the Arch-Wizard has just disappeared in a puff of smoke.

MAX HEADROOM

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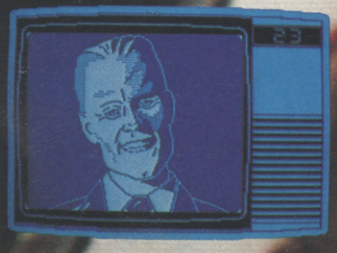

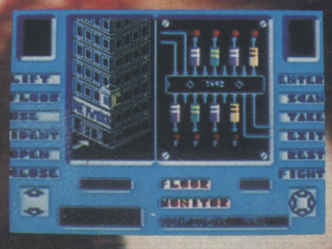

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AWESOME

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REVS

Following the trend they set with Elite last year, Firebird have now taken Acornsoft's other mega-game; Revs. When I first played Revs on the BBC I was astonished by the feeling of reality that it gave.

It seems that at last companies have realised that to sell a new racing car game – when there are already so many on the shelves – it would have to be something really special, and that's exactly what Revs is.

If you have played the BBC version of Revs you will immediately feel at home with your hands splayed all over the keyboard. I've never really been able to play this game with joysticks, although I hear that someone is bringing out a joystick purely to work with this game.

It really is amazing the lengths to which Firebird have gone to in order to keep the game's original features – even to the extent of reproducing the BBC's mode7 menus!

The game places you in the driving seat of a Formula 3 racing car. Originally Acornsoft were helped in the designing of the game by David Hunt (younger brother of Shunt), and you must race around Silverstone or Brands Hatch as fast as possible.

Realism is everything in this game, to the extent that you can see cars approaching in the wing mirrors, and more importantly (especially at Brands) you cannot see over the crests of hills!

This is the type of game that really shows the 64 at its best. The graphics are outstanding, the animation smooth, and the effects add to the general atmosphere.

Take my advice; buy the game, practice like hell, then shut the door, dim the lights and as the immortal Doors song says: "Keep yours eyes on the road and your hands upon the wheel'!!!!!!

Price: £14.95 disc
Graphics: ****
Sound: ***
Playability: ****
CCI Rating: AWESOME
Contact: Firebird, Wellington House, Upper St Martins Lane, London WC2. Tel:01-379 6755.

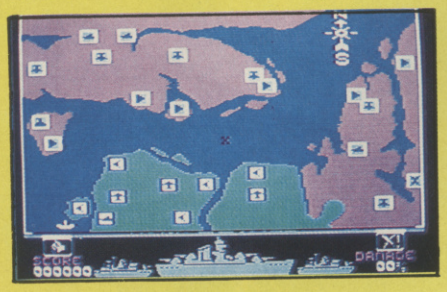
Mega-Review

IFFY

DEATH WAKE

Arcade-Simulations seem to be all the rage at the moment. I can only presume it's because software houses have realised that people want a little more for their money.

Death Wake, Quicksilva's latest release is not the best game I've played recently, but it could appeal to some people.



As the captain of the Undaunted, you are your country's last hope for a victory. Using your one main battleship, and two accompanying frigates you must try and battle your way towards the enemies base, and destroy it with one perfectly placed missile.

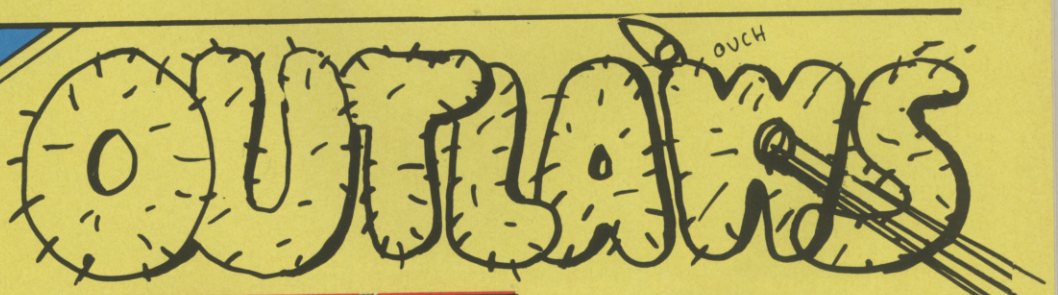
What makes the game interesting is not the addition of a map to try and make it seem strategic, but the different levels you must complete before you have finished the game. These include travelling in convoy through minefields, shooting down enemy planes, avoiding torpedoes, shooting gunships, as well as various other mindless blasts.

Graphically, Death Wake is not outstanding, especially when you have to look at it having played Mercenary, and the sound really is uninteresting – with only the most cursory effects. That apart, I quite enjoyed the game!

Price:	£7.95
Graphics:	**
Sound:	**
Playability:	***
CCI Rating:	IFFY

Contact: Quicksilva Ltd, 222 Regent Street, London W1R 7DB. Tel:01-439 0666

NAFF



OUTLAWS

I have recently learnt that U.S Gold have taken over the sales and marketing of all Ultimate's new titles. This is an attempt to let Ultimate get on with programming decent games; and if Outlaws is anything to go by, they sure need it.

Imhotep, Ultimate's last release, was truly dreadful – unfortunately Outlaws isn't much better. Graphically it is obviously Ultimate – big sprites and smooth scrolling backgrounds, but the game has so little gameplay, and is so boringly repetitive that I can see very few people getting much satisfaction out of this one.

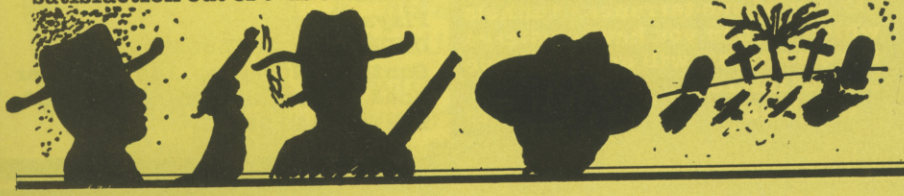
Musically too, Outlaws is below par – in a time when Rob Hubbard and Martin Galway produce such amazing music – to the extent that turning off the sound is almost essential.

When you think that this game costs ten pounds, it is amazing that Ultimate have the nerve to release it. Let's hope that now they have more time, Ultimate go back to their old ways and produce really high quality games – worth waiting for!

Even the horse that you must ride around Indian and Gatlin territory looks as if it's bored with the game. Although they were criticised for being a little lacklustre, the Pendragon series were fab compared to this (come back Arthur, all is forgiven!).

Price	£9.95
Graphics	***
Sound	*
Playability:	*
CCI Rating	NAFF

Contact: Ultimate Play The Game, The Green, Ashby-de-la-Zouch, Leicestershire LE6 5JU. Tel:0530 411485.



AWESOME

MERCENARY

When you've waited for a game as long as we at the office have waited for Mercenary, it comes as a bit of an anti-climax when the game actually comes through the door!

Having actually worked up enough courage to open the packet and load the game I was relieved to see that, even after ten minutes play, this game really is as good as anything I've ever seen – as far as Elitesque wire line (vector) graphics are concerned.

The game is sub-titled; 'Escape from Targ', and in the long run this is really what you want to achieve, but to do this you must aquire enough money, either through the spoils of war, or by taking on missions from the Palyars and Mechanoids.

The game starts by showing your ship crashing into the planet Targ. Although you survive unhurt, your ship is a total write-off. Luckily for you, Benson – your interface to the world around you, and general helper – the computer, has also lived through the ordeal, and immediately tells you of a replacement ship for sale, for 5000 credits. As you have 9000 credits, this seems like a must!

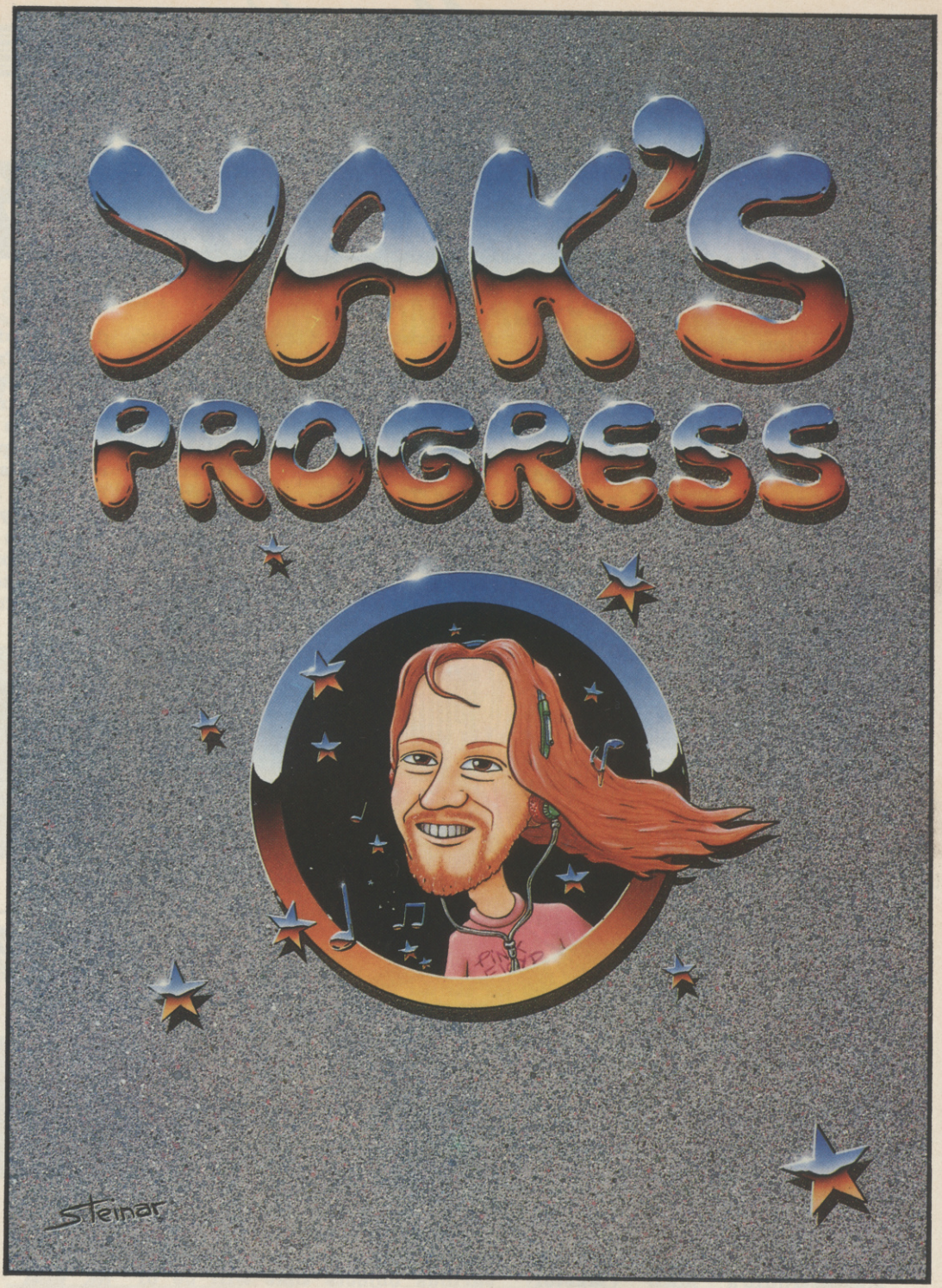
There are two differing types of play that I found proved to be of value to the aspiring superhero. Firstly, you can play the 'lets blast everything in sight' game, but unless you are quite an experienced pilot, you will find that death is an annoyingly frequent occurence.

More practically you can spend an awfully long time just exploring various objects and areas for, as well as the huge overland playing area, there are a variety of sub-terranean tunnels which – when you have mastered the elevators – will quickly prove to be of interest.

Graphically Mercenary has to be one of the most impressive games this year. Using true three dimensional graphics, rather than the pseudo type used on games such as Skyfox. Although it is not running at an amazingly fast speed, it is still amazing what Paul Woakes has done with the 64. The sound too adds to the game, although no memory has been wasted on pretty theme tunes!

Overall, Mercenary is a truly outstanding game, well worthy of all the hype it has and will receive; brilliant! I can't wait for Mercenary II (although if the past is anything to go by, I'll have to!!)

Price:	£9.95 cassette £12.95 disk
Graphics:	★★★★★
Sound:	★★★
Playability:	★★★★
CCI Rating:	AWESOME
Contact:	Novagen, 142 Alcester Road, Birmingham B13 8HS. Tel: 021-449 9516.



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NAFF

BLADE RUNNER

In my view 'Bladerunner' is the best sci-fi film I have ever seen. Although this sounds like a ridiculously sweeping statement, it was not until the third viewing that I really felt I understood all the intricacies of the film and, unlike any other film I can think of, it still keeps me glued to my seat.

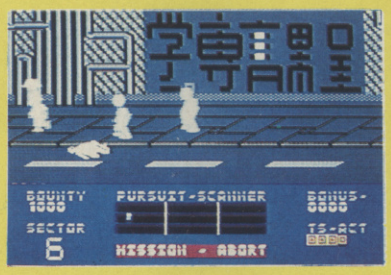
When about three months ago I heard that CRL were producing a game loosely based on sections of the film, I became very excited, and rushed over to see a pre-production version.

Unfortunately the game was nowhere near completion and had very little gameplay. When the finished product arrived I eagerly loaded it.

I suppose it was inevitable that the game couldn't live up to the film, but this game really is a disappointment. Firstly CRL seem to have perfected a Spectrum emulation program, and secondly the game is really repetitive.

Basically you must travel around various 'Sectors' selecting 'Replidroids' which you must then retire. The first map shows you as a diamond and you are helped by a variety of scanners and a link to the police computer.

Once you have picked a replidroid to chase – varying in power from 1-6 – you are shown a display of a street, and having climbed from your skimmer you must run along the street, dodging cars and innocent bystanders, and retire the replidroid.



The graphics lack colour and you are displayed pretty badly, with Harrison Ford's overcoat looking uncannily like a dress. Musically the game is really nice with a section of the film score well represented, but this does not make up for all the other failings!

Price:	£8.95
Graphics:	**
Sound:	***
Playability:	*
CCI Rating:	Naff

Contact: CRL, CRL House, 9 Kings Yard, Carpenters Row, London E15 2HD. Tel:01-533 2918

CRISP

MASTER OF MAGIC

This game, the third in Mastertronic's MAD (Mastertronic Added Dimension) range, is yet another good value product. If you compare this type of game at £2.99 with Ultimate's latest at £10, you really can see why Outlaws has received such a lot of criticism.

Richard Darling, the programmer behind this game, has realised in time that to create a successful game in 1986 you need to combine talents, and as such he has used Rob Hubbard to do the sound (more later) and James Wilson to create the graphics.

The game places you as a character on the screen (represented by a yellow dot), and you must move about a maze, which expands in the direction you travel. Along the way you find various objects that will be of value (potions, scrolls etc) and also you confront various evil characters that will do their best to stop you from proceeding any further. To succeed you must use your spells to the full, and collect weapons and other useful items.

Graphically the lower half of the screen is truly excellent, with some really nicely defined characters. The music is, although not his best, a true Rob Hubbard Classic – and can do no harm to his already respected reputation.

Overall this is another good game from M'tronic, and at £2.99 it must be one of the best value games around.

Price	£2.99
Graphics	***
Sound	*****
Playability	***
CCI Rating	CRISP.

Contact: Mastertronic, 8-10 Paul Street, London EC2. Tel: 01-377 6880.

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* Note due to memory limitations ACE on the C16 and VIC20 (+8K Ram) do not have any ground objects.

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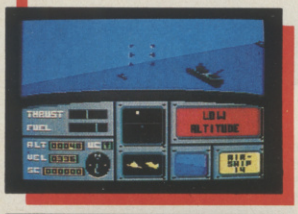

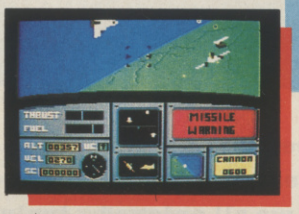

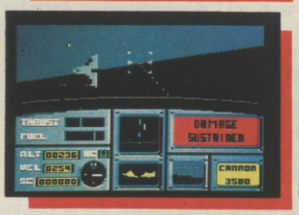

Screen shots are for CBM 64 version. Other versions may vary.

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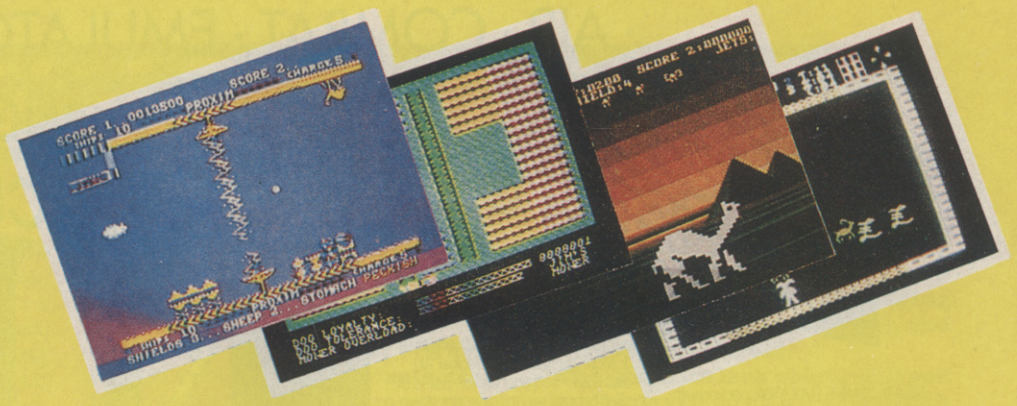
MEGA



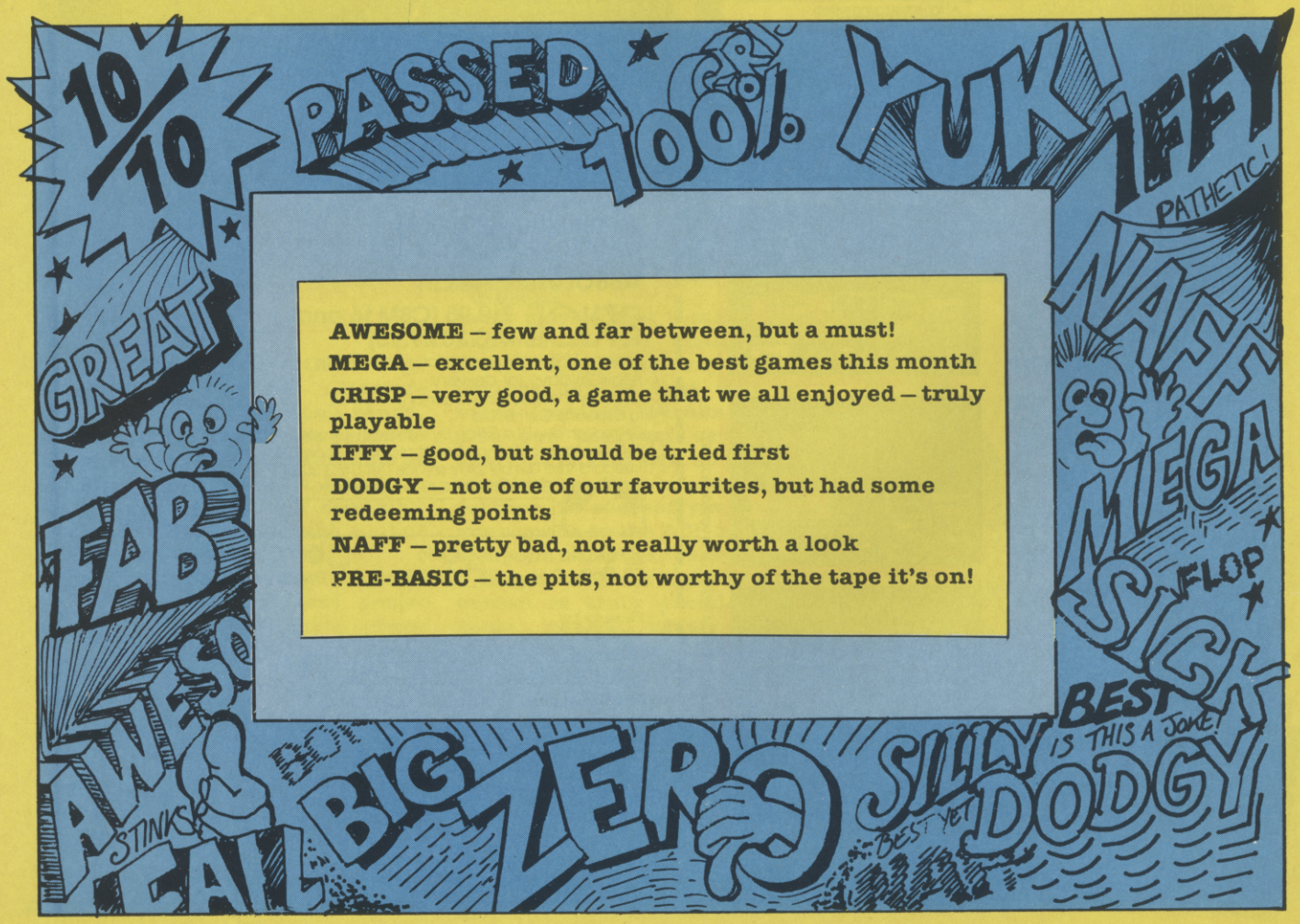
YAK'S PROGRESS

Basically this is a compilation tape with eight of Jeff's 'classics' for the 64. Each of the games show Jeff's progression through the quality of ideas as well as execution, and for £9.45 on cassette for the two tapes and notes from the Hippy himself, it has to go down as mega-value for money.

The games included are; AMC, Matrix, Hover Bovver, RMC, Sheep in Space, Megagalactic Llamas battle at the edge of time and Ancipital. If you're a Minter fan you'll have these games anyway, but if not – and you want to get eight games that between them give endless nights of enjoyment, then this is certainly for you.

Soon Jeff will be starting on a new game for the 64, and if it manages to improve on Batalyx, it should really be worth waiting for – let's just hope he doesn't break his neck on the slopes before it's finished!

Price:	£9.45 twin cassette £11.95 disk
Graphics:	**–**** (dependant on game)
Sound:	**–**** (dependant on game)
Playabiltiy:	****
CCI Rating:	MEGA
Contact:	Llamasoft, 49 Mount Pleasant, Tadley, Hants. Tel: 07356 4478.



AWESOME – few and far between, but a must!
MEGA – excellent, one of the best games this month
CRISP – very good, a game that we all enjoyed – truly playable
IFFY – good, but should be tried first
DODGY – not one of our favourites, but had some redeeming points
NAFF – pretty bad, not really worth a look
PRE-BASIC – the pits, not worthy of the tape it's on!

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DISC TO TAPE: Memory resident disc programs can be backed up onto tape. (Saved at turbo Speed.)

DISC TO DISC: It is possible to make a self contained back up of disc based programs that will both **load at high speed** and **allow the rest of the disc to be used as normal**.

TAPE TO TAPE: Tape back ups can be made at turbo speed with just one tape deck.

CUSTOMISE PROGRAM: The process can normally be actuated at **any stage** of a program, this means you can SAVE a program at a critical stage and restart at that point in the future!! if you like putting "POKES" into programs for extra lives etc. you can save a version with these active.

In fact "Freeze Frame" is the **ultimate utility**, it works on the program in memory and allows you to make a back up of that program onto tape or disc. The beauty being that the saved version is fast loading and in the case of disc backups no longer has drive damaging DOS errors. The process is **completely automatic** no knowledge of BASIC or machine language is required, just follow the prompts and the simple instructions for **amazing results**.

"Freeze Frame" is a hardware "device" that plugs into the cartridge port of the '64. It does **NOT** dump the entire contents of memory, just the **working program and parameters**. Programs converted run **independently** of the hardware. It is also compatible with the "128" in '64 mode and 1570 disc drive. In tests "Freeze Frame" has proved 100% successful with software tested.

ONLY £39.95

WARNING: Don't be misled by other adverts, if you want to transfer turbo load programs to disc, software only utilities are inadequate. They suffer from a variety of drawbacks including poor success rate, awkward to use, greedy on disc space and overpricing.

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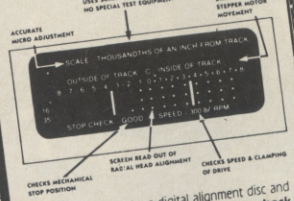

The program includes a digital alignment disc and software which allows you to **accurately check and correct** disc drive alignment. The instruction booklet is **very detailed**. Also includes quiet drive stops to **stop** that "hammering" thus preventing further problems.

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Improved DOS commands (DOS 5.1) makes for easy use of the disc drive. e.g. $(RETURN) will LOAD and display a directory without overwriting BASIC. SHIFT RUN/STOP will LOAD "0:*",8,1 etc. etc. very very useful.

Incorporates Centronics Printer software [user port] **with CBM graphics** capability. See "Commodore Connexion" for suitable lead.

A RESET switch is fitted. [We have found this to be "unstoppable", it also preserves the tape buffer.]

NO MEMORY IS USED by this cartridge. It is totally "transparent" and uses special switching techniques.

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"Dual Driver Nibbler" allows the use of two drives to make **even faster back ups**. Incorporates device number change software so no hardware mods necessary.

"Nova Transfer" will **transfer to disc** the latest Nova Load programs including **multi stage loaders**. A very useful utility that is of particular use for the programs that need to load more information as the program progresses.

As well as these important newcomers all the old favourite utilities which have helped earn "Disector" such a large following are included. These include **Menu Maker (selective)**, **Fast Format**, **Unscratch**, **Disc Monitor**, **Disc Orderly**, **Fast File Copy**, **Index**, **Index**, **plus several other useful utilities**.

The whole package is menu driven and has its own fast boot system built in for your convenience. Pays for itself the first day you receive it.

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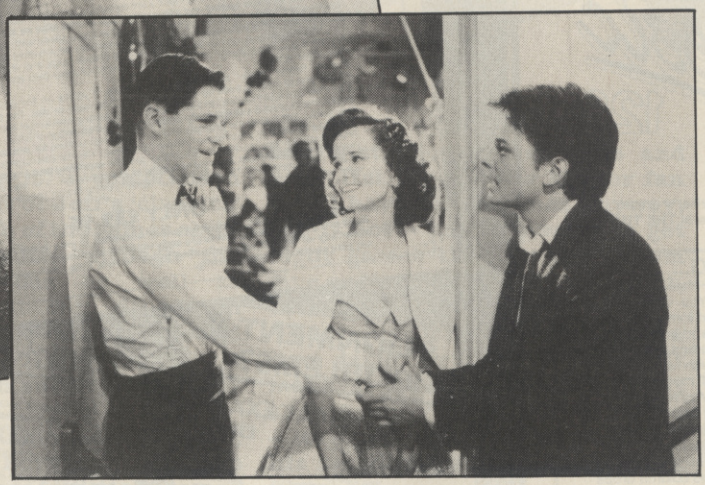
Marty turns wimp pa to tough guy, as he and the mad Prof look back to the future.



BACK TO THE FUTURE — The Film

Think about it – if your parents hadn't met, you wouldn't be here today! The past controls what is happening to you now and what is to come... In "Back To The Future" a boy called Marty gets catapulted back into the past to 1955 and finds that not only is he stuck there for a week, but that if he doesn't make sure that his parents meet and fall in love he won't be born – a big responsiblity, huh!

This particular task is made all the more difficult by the fact that his mother as Marty puts it "gets the hots" for him and that his father is a wimp who attracts bullies instead of girls, so he has to fix the past so his own future really will happen! Time – as they say – is of the essence.

As a lover of films like "The Time Machine" and books like Heinlein's "Door Into Summer", "Back To The Future" was a sheer pleasure for me to watch. And the suspension of disbelief which is necessary for the enjoyment of fantasy, which for so many films has to be very forcibly maintained, was in this film in no way at all an effort, as I quickly got drawn into the fast moving believable plot.

Marty, played by Michael J Fox, put up an excellent performance both polished and extremely energetic, daringly skateboarding everywhere and doing a very good Chuck Berry strut. He was accompanied by an inspired piece of casting of Christopher Lloyd as the zany proffessor (a familiar face as the crazy mechanic from the television series "Taxi"). Even the music was great, featuring the track by Huey Lewis and the News – "Power of Love".

Back To The Future? If you havn't seen it yet, now is the time. If you've gone already, like me you'll probably want to go back again.

BACK TO THE FUTURE — The Game

If you enjoyed the film (Yes! Yes!!) and you liked the music (Yes! Yes!) and maybe you're even into skateboarding (Yippee!), then this game could quite well be for you!

Although I have only seen the preview (courtesy of Activision's own Dynamite Dan – Andrew Wright) I can safely say that the game could either be brilliant, or not!!

The object of the game is to get your parents (who aren't yet) together, and stop your mother (who isn't yet) from falling in love with you. You must stop Biff (the bully) from causing you trouble. Finally you must do all this in time to make sure that your two pictures, one of you and one of your family (yup, they aren't yet either!) are completed rather than disappearing.

As Marty McFly you really have got a difficult job on your hands, but to help you various objects are spread around the playing area. These include Love Poems – to help your father (Who isn't – ahh you know!), Cups of Coffee, an Alien suit to scare your Pa into action, and a guitar so you can do your Chuck Berry, impressions.

To accompany the game you have a rendition of Huey Lewis and the News' – The Power of Love, produced for Electric Dreams by Rocksoft.

To finish the game you must complete the pictures and then get back to the converted Delorean that can take you.....BACK TO THE FUTURE!!! (Good ending eh???).

One thing you can be sure, "Well, it's got a lot of potential".

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Name: Rob Hubbard

Age: 30

How long have you been a freelance music programmer?: "Well I've been doing it since I got my 64 around three years ago, but I've only been successful for about 6-7 months"

Musical Taste: "I try to take notice of almost everything, but I really like Chick Corea, classically I like Ravel"

Who have you done work for?: "I've done work for a variety of companies including Mastertronic, Martech, Gremlin, Elite, Firebird, Alligata, as well as a few others."

What equipment do you use?: "For composing and developing tunes I use a small Polyphonic keyboard, and I write things down on manuscript paper. To actually enter it into the 64 I use my own music program, although this is really little more than a machine code source file"

Do you consider yourself a Musician or a Programmer?: I'mdefinitely a musician, I do gigs around the Newcastle area as a musician, computers really come second"

What's the best soundtrack you've done?: "Really it's a toss up between Martech's 'Crazy Comets' and Mastertronic's 'Master of Magic'. I also really like the work I've done for Gerry the Germ goes Bodypopping"

What's your favourite soundtrack apart from your own?: "Really it must be Rambo's loading music, the effects on that are really special, otherwise I really like Activision's Master of the Lamps."

How long does it take to program a soundtrack?: "Generally I'd like to have between two and three weeks to do a track, meaning I can get everything right. On the other hand I did the Commando music in 24 hours solid!"

How much RAM is allocated to your soundtracks?: "Really it depends on what's available. The most I ever had was 5.5K for Monty on the Run, but for Master of Magic I only had 3K, but still it goes on for nearly 6 minutes."

What does the future hold for you?: "That's a really difficult question I'd like to get an Amiga as soon as possible and progress onto doing work on that. Hopefully I'll have one before March."

How many soundtracks have you done?: "I suppose I've done around forty different pieces which were spread over about twenty different games."

I must thank Rob for being so helpful, and I look forward to some of his new releases, especially a couple he mentioned by Firebird. I also cannot wait for him to get hold of an Amiga, that should produce some really special results!

Francis Jago

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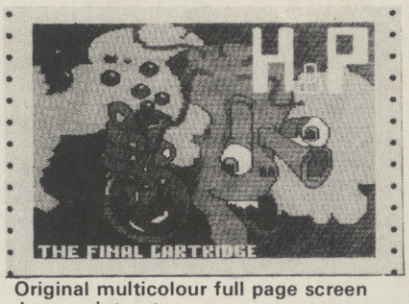
* works with C128 in the 64 mode.



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Diary of an AMIGA

Some of you may recall that fateful day in the summer of 1985 when PCW magazine published an article penned by the redoubtable Guy Kewney about the forthcoming AMIGA-PC from Commodore. We had all heard and read a little about this mighty machine but Kewney's article was the first to give us a relatively detailed insight. The more I read the article the stronger my intention of purchasing one became.

I avidly scanned many magazines including sending off for copies of American imports, pestered many people all in a concerted effort to glean as much information as possible about the AMIGA. By the time the PCW Show came around I had formed the conclusion that if the AMIGA ran as well as it read, it was the machine to buy.

Up until the announcement of the AMIGA, I did have my eyes on the ATARI 520ST; I would imagine that this being much the case with most serious users of home micros. I looked forward to seeing this in the flesh (or should it be plastic?), at the PCW Show. I arrived at Olympia and battled with the crowds, heat and humidity and was dutifully impressed with the ATARI machine. However, since I was lending a hand on somone's stand for the week, rumours that the AMIGA was at the Show began to reach my ever-open ears.

The sources of the rumour seemed impeccable and by the second day I had tracked down the location of the AMIGA demonstrations and formulated a rough plan of how to get past the Commodore guards. All that remained was to carry it out. Faint heart never won a fair lady, or so they say and since my plan was based on 99% bravado and 1% cheek, by the time I had managed to enter the hotel suite where the demonstration was being held, I felt sure that the proportion of these ingredients of my plan had reversed.

Amiga Demonstration

My tenacity was well rewarded; a short video of the launch in New York, a quick talk by Gail Wellington and then with a sleigh of hand worthy of Paul Daniels, off with the covers and there they were. Stifling my natural instinct to race over and start bashing away at the keyboard, I showed incharacteristic restraint and casually sauntered over with the air of a battle-hardened veteran – besides I didn't want to be first to crash the machine! Yes, this was the one for me, the more I saw of AMIGA merely stiffened my resolve to buy one at the earliest opportunity. To the amazement of the others on the stand I stopped sneaking off to haunt the ATARI area and started to bore everyone by extolling the AMIGA and how much better it was than the 520ST.

"A dream of a computer," is how the Amiga has been described. It was love at first sight for Bill Donald and this is his story!

I hadn't seen much of my wife Janet during the week of the PCW Show and when it was over I mentioned that I had seen the AMIGA. Amid the collective groans from her and the cat I announced that I intended to buy one just as soon as I could. Applying the normal feminine instinct of domestic practicalities she asked "where are you going to put it, the amount of stuff you already have takes ALL of the spare room, you couldn't swing a cat in there.....besides where is the money coming from?" demonstrating further understanding of the more mundane aspects of life in 1985. I quickly shrugged off the objections.

"How much were you thinking of Mr.Donald?" asked the bank manager between sips of Maxwell House and pages of my proposal cunningly enhanced by judicious of the the Koala Pad and Epson RX80 bit-map graphics. Years of training and dedication to the tradition of the banking equivalent of the stiff upper lip enhanced by several successful rounds of verbal and financial jousting with me suddenly slipped like a mask when I tried to make the phrase "Two thousand should be sufficient" sound like a mere bagatelle while maintaing an earnest but serious face at the same time.

He let go of the copy of my current account statement and then opened one of his drawers and for an instant I had a vision of newspaper headlines reading something like 'bank manager shoots customer' or 'bank horrified at managers suicide in front of customer', which quickly passed as he took out a clean tissue and carefully returned my current account statement into it's folder and then equally carefully began to dab the red ink from his fingertips. I will draw a veil over the rest of the proceedings. However, later in October he relented and having once more obtained the necessary signature regarding the sale of my life, limb and soul gave me the go-ahead.

Collecting the Amiga

I swiftly conveyed my intentions to Commodore at Corby and indicated that I would like an AMIGA as soon as the funds were made available. I received the distinct impression that I was not being taken seriously and it was only upon my arrival at Corby on 8 November that they realised that I did actually want one. The scene in the reception was one I will forever relish; on being asked how would I be paying the £1776.33 I replied "cash!". However disaster struck in the form of no monitor. Some foul-up in delivery rates, problems with the Customs and Excise, a points failure at Clapham Junction, you name it, an excuse was forthcoming. They assured me that having taken the money for the monitor an early delivery would take place.

I departed from Corby rather unhappy at this, wondering as I drove back to Kent down the magnificent M11 how to get this one past the wife. "What, you mean you have paid nearly £2,000 and you cannot even use it?" she hissed that evening. My wife can be very hurtful, accurate but hurtful, oblivious to the pained expression on my face. I attempted to divert the issue into the huge amount of reading that would be necessary to understand the AMIGA. Corby had managed to provide several volumes of manuals referring to various parts of the system and they were comprehensive to say the least. She was still not amused!

I had, by now become a victim of my own mouth; a lot of friends had, on previous occasions been bored rigid by my own conversations on this wonder-machine and since the AMIGA had arrived chez Donald, they all trooped around to be suitably impressed. Needless to say, they all trooped back out again singularly unimpressed, "fancy door stop" or "expensive slab of plastic you have there Bill" were some of the kinder remarks passed. Your writer's credibility started to plumb new depths! With increasing difficulty I put on a brave face and continued ploughing through the manuals, if nothing else then at least I had a fair inkling of how to set up and run the AMIGA.

Multitudes of Manuals

Friday 29 November dawned bright and sunny and the post brought forth a receipted parcel from Commodore. My initial reaction was to assume that it was the fabled monitor but the parcel's size indicated otherwise. I quickly opened it and found large quantities of amendments to the existing manuals. This kept me occupied for a few hours until lunchtime was heralded with the growling arrival of a delivery truck.

The thought crossed my mind that probably one of the neighbours has bought another microwave oven thus providing oneupmanship at one of the innumerable Tupperware parties they have around

here; "We've now got TWO microwave ovens Daphne, we keep the new one in the bedroom just in case Rod feels like a midnight snack."

I opened the door to be met with a very, very large box marked with the magic word 'monitor'. Resisting the temptation to open it there and then on the doorstep, I signed the note proffered at me by the Geoff Capes clone and rushed upstairs with the box to my inner sanctum. The moment of truth had arrived and I felt the ghosts of my wife, bank manager and friends looking over my shoulder all chortling with glee that it wasn't going to work. In the event it did and the welcoming image of a hand clutching a disk marked 'KICKSTART' caused me to issue a sigh of relief that must have been heard around most of Kent.

The Package

Before I go any further it would be as well to let you know just what I have received in exchange for the money. The standard machine comes with 256k RAM, internal 880k 3.5" disk drive, high resolution colour RGBA monitor, introductory literature, system disks and a version of Microsoft BASIC tailored to the AMIGA.

The AMIGA which I have is an enhanced configuration aimed at software developers. My machine has the plug-in RAM pack which gives it 512k RAM, an additional drive which is an external 880k 3.5" giving a total storage of 1.76MBytes, a full set of system documentation, various disks containing a 68000 assembler and monitor, a C language compiler, a BASIC interpreter (in this case by Metacomco), and some demonstration programs.

The documentation consists of the following:-

1. Introduction to AMIGA
2. Lattice C Compiler Manual
3. AMIGA DOS Technical Reference Manual
4. AMIGA DOS Developers Manual
5. AMIGA DOS Users Manual
6. AMIGA Hardware Manual
7. AMIGA ROM Kernal Manual
8. Intuition Manual

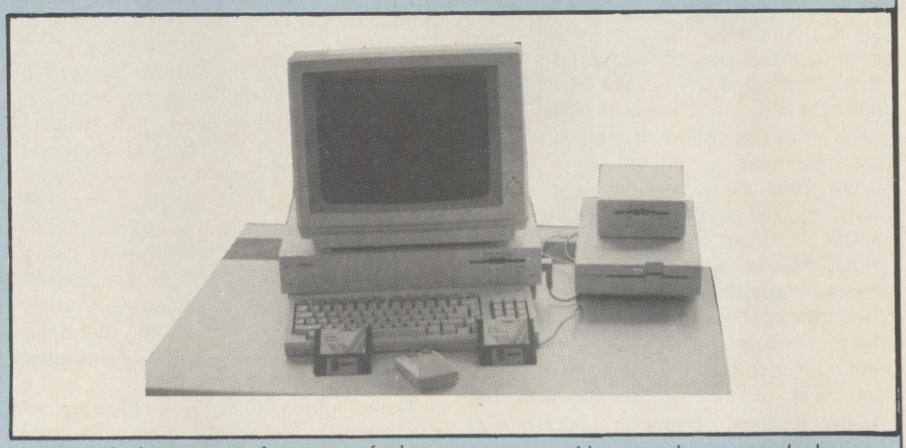
As you can see it is a step up from the C64 Programmers Reference Guide for both myself and Commodore; the volume of number of pages runs into the thousands rather than hundreds and this is STILL early days! It was because of this daunting weight of material on AMIGA that Commodore Electronics Ltd, (the parent company for the Western Europe Commodore companies) hereafter referred to as CEL, decided on the need for a conference to familiarise software houses and professional programmers with the facilities of the AMIGA.

The Conference

This was held at Eastbourne in early December 1985 and although at the time when I collected my AMIGA from Corby I had ignored the requests that it would be a good idea to attend this conference, a week later I soon realised that it would be VITAL, if I was to start writing about how the AMIGA works.

The imposing Victorian edifice of the Grand Hotel served as the backdrop to the conference and my initial impression was surprise at the large number of attendees and even more remarkable was the proportion of French, German, and Dutch – virtually every nation in Europe had someone there.

The conference started on Monday 2 December although there had been a 'welcome' buffet the previous evening. This gave me a chance to look for faces that I knew in the crowd. Thankfully, there were a few and the fact quickly emerged that not very many actually had an AMIGA. Those who didn't were largely sceptical of the machine, but those who did have one developed enthusiastic conversations and I was soon comparing notes.



One of the prime features of the Eastbourne conference was the introduction of some of the team responsible for the AMIGA. In time most of these names will become familiar to you and I suppose it gave them a welcome break from the Californian sunshine to be met with three solid days of British rain! We were issued with yet more documentation and using slide shows, demonstrations, question and answer sessions we were led through the full maze of the AMIGA. It was at times, pretty heavy going and the proceedings served to throw up yet more questions than answers. Anyone who has ever attended a training course, seminar or conference like this will know that the REAL benefits arise during the evening social functions and Eastbourne proved no exception to this. One of the attractions lay in the number of AMIGA's that Commodore had left up and running in one of the lounges. This meant that if you didn't feel like conversation you could try and capture an AMIGA and attempt to impress those who didn't know how to operate it!

One or two highlights of the conference that spring to mind were the demonstration of De-Luxe Paint by Tim Mott of Electronics Arts. This brought a new demension to the meaning of high – resolution graphics on a personal computer. The other was a simple program showing the text-to-speech facility and I remember the delight of Commodore's John Collins as some french words were keyed in and from out of the monitor speaker can "Bonjour Monsieur Collins, comment allez vous". All the more amazing when I learned that this program was written in BASIC!

Sceptics converted

By now of course, the sceptics had been well and truly converted and most of them made clear their intention of purchasing an AMIGA as soon as possible. In fact all of the machines that were in use at the Grand Hotel were bought and taken away at the end of the conference!

Eastbourne was exhausting mentally and physically. My evening activity of having long and invloved conversations in the lounges quite oblivious to the clock had started to take its toll, one memorable evening running through until 4.0 a.m. and by Wednesday I was all in.

I returned home to be a great deal more wiser about what the AMIGA could do and more importantly, how this could be done on my own machine. So far it has proved to be worth every penny I have paid for it and I have not regreted a minute of it.If there is one complaint it is the retail price of the double-sided 3.5" disks, circa £3.50 each, a far cry from the sub-£1.00 price we pay for 5.25" disks. I suppose as the smaller disk achieves more sales volume then the price will come down, but it hurts paying over £30 for a box of disks.

Whilst on the subject of money, I have been asked many times the question of the cost of the AMIGA. My own feelings on the matter are this; once you have actually seen or even better, used the AMIGA then the whole question of costs starts to dissolve in the sea of machine power. The Atari slogan of 'power without the price' paradoxically can be well applied to the AMIGA. We are still novices to the strengths inherent in the use of multi-tasking, to sound that makes the 6582 SID circuit take on the quality of a semi-strangled turkey, to graphics that are more often seen on dedicated CAD machines costing tens of thousands. AMIGA has power that subjugates price.

I'm just rubbing my hands over the prospect of AMIGA II already. Try to imagine a 68020 processor, internal 50 MByte hard disk, an output port spec as long as your arm, 2 MByte RAM; I must stop this day-dreaming or am I?

Insights Into the Plus/4 Part II

Bill Donald provides futher fascinating insights into the Plus/4, looking at second processors and networking.

In the previous article on the PLUS/4 (see January 1986 issue of CCI) we looked at the PLUS/4 hardware. In this article I want to examine further the internal routines and then move onto more esoteric topics such as second processors and networking employing the User Port. I hope that you find this of interest and value, particularly if you own a PLUS/4.

The bank switching of the PLUS/4 can be difficult to grasp because of the number of variations that are possible. The operating system compensates for this a little by the inclusion of three routines termed LONG FETCH (LNGFET), LONG JUMP (LNGJMP) and SERVICE INTERRUPT (LNGIRQ). These are located within the KERNAL address space and are available in whatever combination of banks you have selected.

Taking the first routine LNGFET, this can be found at address $FCF7 (64759) and its function is to transfer a byte from one bank to another. Applications for this could be storage and retrieval of high-resolution graphics data or array variables separate from those designated by the BASIC interpreter. LNGFET runs quite quickly and the speed could be improved by taking the main processor into fast mode which entails disabling the video output. There are faster algorithms available, but in the interest of program compatibility within Commodore 8-bit machines you would be well advised to stick with KERNAL routines. LNGFET works as follows:-

1. Disable machine interrupts.
2. Load accumlator with lo-byte of start address, go to step 3 and return, repeat with hi-byte of start address.
3. Store at $BE (FETPTR-lo) and $BF (FETPTR-hi) the destination in lo-hi order
4. Load accumulator with present bank selected (see previous article for details of this technique)
5. Load X register with destination bank combination.
6. Load Y register with offset derived by subtracting from base of selected bank to actual address selected.
7. Call LONG FETCH
8. Selected byte deposited into accumulator
9. Do what you like with it!

The structure of assembly language listing would look like this if you wanted to transfer a byte located at address $80AB from External Bank 2 whilst the PLUS/4 is configured as at power-up:-

```
SEI ; disable interrupts
LDA £$17 ; lo address
STA $00BE ; FETPTR lo-byte
LDA £$90 ; hi address
STA $00BF ; FETPTR hi-byte
LDA £$00 ; standard configuration – KERNAL and BASIC enabled.
LDX £$03 ; external 2 LOW with KERNAL enabled, BASIC disabled.
LDY £$AB ; i.e. $80AB – $8000 = $AB
JSR $FCF7 ; call LNGFET
STA $0C00 ; put the byte into the top left corner of the screen. Don't forget to re-enable the interrupts if necessary.
```

LONG JUMP, the second of the KERNAL routines is located at address $FCFA (64762). This is a very powerful and versatile function with unlimited possibilities, however, it does need to be used with care. The purpose of LONG JUMP is to execute a section of code located in another bank. I feel it would be presumptous of me to describe any uses for a routine like this since I am asssuming that most readers who have stayed the course this far are not beginners where machine code work is concerned. For those of you who are particularly creative programmers I would suggest that you explore the area of input/output. LONG JUMP works as follows:-

1. Load the accumulator with present bank selected.
2. Load the X register with destination bank selected.
3. Store the address where the routine is located in lo-byte and hi-byte order in LNGJMP vectors located at $05F0 and $05F1 respectively.
4. Store in FETARG ($05F2) the value that you want to be avilable in the accumulator after you have called LONG JUMP.
5. Store in FETXRG ($05F3) the X register value after the routine entry time.
6. Store in FETSRG ($05F4) the status register value on return from the routine
7. Call the routine LONG JUMP.
8. Look into your accumulator, X register and Status register for the preserved values you specified.

Note how the routine uses vectors located in Page 1 rather than in Page 0, presumably because of shortage of space. This does build into the routine a certain amount of delay overhead and the Y register unfortunately is not preserved, so do not use this for anything important during the use of LONG JUMP. Here is a specimen assembly language listing which executes a routine located at $C2FF External Bank 1 with the PLUS/4 in normal power-up mode:-

```
LDA £$00 ; present bank configuration (see Part 1 of this series in January 1986 CCI)
LDX £$01 ; external bank 1 select procedure
LDY £$FF ; lo byte of routine location address
STY $05F0 ; put it into LNGJMP lo byte vector
LDY £$C2 ; hi byte of routine location address (i.e. $C2FF)
STY $05F1 ; put this into LNGJMP hi byte vector
STA $05F2 ; preserve the present bank configuration
STX $05F3 ; preserve the selected bank variable
STA $05F4 ; preserve the status register
JSR $FCFA ; call LONG JUMP
```

SERVICE INTERRUPT is really a utility routine and covers the need to attend to an interrupt when you engaged in external banks 1 and 2. LNGIRQ is located at $FCFD (64765) and re-enables the BASIC/KERNAL bank or power-up configuration when an interrupt occurs in order to

service the interrupt. Program control is then passed back to wherever the code was interrupted. LNGIRQ is operated like this:-

1. Save the accumulator onto the stack.
2. Do the same to the X register, to preserve it.
3. Put the current bank combination into the accumulator.
4. Call the routine LNGIRQ.

I have included below a listing below for those who need it.

PHA ; push accumulator onto the stack
TXA ; transfer X register contents to the accumulator
PHA ; push that onto the stack
LDA £$XX ; save the bank number select of the present bank you are operating in
JMP $FCFD ; see to the interrupt

The above listings are meant purely for demonstrations of techniques, they are not designed for optimum use of memory and speed. There are two other banking routines in the KERNAL, one of which is of some interest, namely the PHOENIX which is located at $FCF4 (64756). This is for an autoboot of the internal ROM, in other words call this if you want to enable the 3+1 software of the PLUS/4.

It's now time to move theorectical side of interfacing to the PLUS/4. There is very little published information on the hardware of this machine (one of the main reasons why this series came about) and I have to admit that shortage of time and a heavy invlolvement with my AMIGA since November 1985 has precluded any direct experimentation on my part. There are two elements of interfacing the PLUS/4 that take my personal interest, the first being second processors and the second being networking.

At the home computer level second processors seem to be coming back into fashion. The BBC micro is the one taht springs to mind and users have a choice of either a 6502 or the Z80. Commodore did experiment with a second processor option on the C64, albeit not too successfully from a reliability standpoint, whereas the SuperPET with its 6809 option was successfully implemented. The C128 reinforces the popularity of second processors and carries aboard the ubiquitous Z80 for running CP/M. So what is the attraction of second processors and what are they?

A second processor gives the programmer two very useful features; the first being the ability to increase the RAM size without the complications of bank-switching, the second being the opportunity of using a different processor within the same machine and if need be a different operting system. Taking the first point of increasing the address space, an 8-bit processor can only 'see' 64k of RAM however, if you 'daisychain' processors together then each processor can share the same 64k of RAM or have their own 64k of RAM. The drawback to sharing RAM means that you are effectively bank switching in blocks of 64k, whereas separate RAM allows multi-tasking. For instance some processors are argueably better at maths routines than others, so designating maths routines to this processor whilst the native processor carries on at what it is best at can be done. Similarly, it is possible to have the second processor running at a higher clock speed so a 'turbocharger' concept is possible. The versatility offered by a second processor as a 'bolt-on goodie' is really only limited by your knowledge of microcomputer hardware particularly in view of the fact that 8-bit processors now cost less than £5.00. The second feature of different operating systems is well illustrated by CP/M on the C128.

Current knowledge of the PLUS/4 hardware suggests that if a second processor on a shared $FF00 to $FF1F and seemingly cannot be switched out of the address space irrespective of machine configuartion. The problem can be overcome in two ways, do not use shared RAM or write your program in such a manner that it avoids laying code into this address space. For instance, to install CP/M on the PLUS/4 using the C64 Z80 card would entail study of the expansion port diagram published in my previous article, building a male to female jumper connector to link the 44 pin card to the 50 pin port, then modifying the C64 CP/M BIOS and CCP programs. Anyone who gets as far as this must surely qualify for the 'Hacker-of-the-Year-Award' and should question really why they still messing around on home computers, I'm sure a job would be instantly available at one of the manufacturers! It is obviously beyond the scope of a magazine article to provide an in-depth discussion of second processors, however, I hope that I have stimulated some ideas within some readers.

Networking is a much hackneyed word within the computer industry and I make no apologies for providing my own interpretation of the word within the context of the PLUS/4. At a basic level and from personal experience of my own equipment my PLUS/4 and C64 share peripherals such as the 1541 drive. Occasional hang-ups do happen and provide I do not access the serial bus from both machines similtaneously, I have run the PLUS/4 version of SUPERBASE ,on one 1541 diasychained to another 1541, which in turn is running SUPERSCRIPT on my C64. The two machines seem quite happy to share the bus and although it is detachable which machine, the PLUS/4 or C64, is in actual control of bus, it would seem that on power-up the C64 acts as initial controller since it will run the 1541 immediatley, whereas the PLUS/4 prefers to go second and goes into a temporary sulk if asked first! I will refrain from describing any possiblities utilising this feature since I'm sure that you could well create your own.

The PLUS/4 supports RS232 more effectively than the C64 or VIC-20 and provides more features to the programmer. To fully implement RS232 you would have to provide a board with 1488/1489 line drivers to take the voltage up from 5.0 to 12.0, the true RS232 voltage level. This only becomes necessary if you were linking to another machine such as the BBC, the other Commodore home machines operate on the 5.0 volt TTL range. The reason why the PLUS/4 is much better than the earlier machines in terms of RS232 is because it does have a 6551 ACIA circuit. The C64 and VIC-20 emulates the 6551 ACIA by means of software within the KERNAL and the tradeoff for this being a maximum of 2400 baud transmit/receive rate whereas the PLUS/4 can run at a respectable maximum of 19,200 baud. In fact this was one of the main reasons why I purchased the PLUS/4.

I feel that the true latent strength of the PLUS/4 lies within the machine itself. The on-board ROM software is the key to this strength; no, I'm no t impressed with 3+1 and what I intend to do is to remove this"!?!!??" and dispatch it to the nearest dustbin. Then using thenow very reasonably priced EPROM blowers create a variety of ROM's containing for example, fig-FORTH or dare I say it COMAL (I hope that Brian Grainger, the ICPUG guru on matters COMAL is not reading this!) The whole principle is really identical to the sideways ROM idea as used on the BBC in the sense of user-installed ROM's. I hope that this has not proved too overwhelming to non-technical readers and made all those who don't own a PLUS/4 think very hard about buying one. Street prices now make this one of the cheapest entries into Commodore home computing and for existing owners there's a little ego-tripping on saying you now have TWO machines.

C16 and Plus/4: Your questions answered

Dear Editor,
I am one of those many thousands of people who, after purchasing a Commodore Plus/4 computer am having difficulty locating software, dealers, etc.

I would be grateful if you could give me any advice or information you may have regarding the purchase of such elusive material.

Peter Hope,
Stretford,
Manchester.

We are currently putting together a list of software and peripherals for the C16 and Plus/4 which we hope to publish in the next issue.

In the meantime, you may like to contact Venturegate who are now offering a special service to C16 and Plus/4 owners. A selection of 125 programs are available on a mail order basis. Venturegate are planning a software club offering discounts and software lists updated on a quarterly basis.

For more details contact:
Venturegate Ltd.,
17 Harold Road,
Leeds 6 IPR.
Tel: 0532 661 834

Dear Editor,
Please could you tell me whether there are any printer interfaces available for the Plus/4?

Ian Nichols,
S London.

FCC offer four interfaces compatible with the Plus/4 and C16, ranging in price from 47.50 to 64.99. For more information contact:
FCC Systems Ltd.,
The Lodge,
Moorlands Road,
Merriott,
Somerset TA16 5NF.
Tel: 0460 73442

CCI has been inundated by enquiries from C16 and Plus/4 owners since Christmas. This month we devote our Queries page to them.

Dear Editor,
Is there a Rampak for the C16 to increase memory, and will I then be able to run 64 software on the C16?

Colin Williamson,
St Helens,
Merseyside.

The answer to the first half of your question is yes. MCT have 64K Ramboard for the C16, costing 49.95. This is fitted internally and automatically provides access to 60671 bytes free to Basic. However, this DOES NOT mean that software written for the 64 can now be run on the C16.

MCT can be contacted on 0603 633005.

Dear Editor,
I write to you as the proud owner of a Plus/4. Proud because I think it is probably the best value for money available especially with the 1551 disk drive and MPS 803 printer.

I'm not entirely happy with the dearth of software and peripherals, but I believe a lot of this is due to negative attitudes in the trade and I hope that the good sales over Christmas may improve this.

I would like to ask if there is a modem suitable for Prestel for the Plus/4?

Peter Healy,
High Wycombe,
Bucks.

I'm sorry to say that we were unable to trace a modem compatible with the Plus/4. However I would like to take this opportunity to make a plea to all manufacturers to send us details of all C16 and Plus/4 products for inclusion in our lists.

Dear Editor,
Can you tell me why there is so little attention paid (by software houses – even Commodore itself) to the Plus/4 and the form of Basic it uses (Basic 3.5)?

Why has Commodore withdrawn, or never published, the 'Plus/4 Programmers Reference Guide'?

John Marsh,
Guildford,
Surrey.

Firstly, companies we have spoken to are now aware that there is a substantial demand for Plus/4 products and we can only hope that this will generate the production of further products.

With regards to the existence of a reference guide, Commodore never published the equivalent of the Programmers Reference Guide series for the C16 or Plus/4. What they did do was to put together a photo-copied guide of around 120 pages called the C16 and Plus/4 Programmers Guide.

The review of this guide published in CCI November 1985 reached the conclusion that it wasn't worth the £9 Commodore were asking for it.

If you are interested, it is available only from Commodore at:
Commodore (UK) Ltd.,
1 Hunters Lane,
Weldon,
Corby,
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Tel: 0536 205555.

Do you have a computing problem, or advice to offer other readers? Write to us at:
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Please do not send your SAE's as it is impossible to reply personally to every query.

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C16 – Pick of the Bunch

"What games are there for the C16?", is a cry we have heard many times over the last month. Well, we've put together a selection of C16 games to tempt you.

Believe it or not, there are over one hundred games titles for the C16. (Don't forget you can also run C16 software on the Plus/4, but not vice versa.) Conversions have been made of popular games and many C16 owners will welcome the news that US Gold have converted its mega-hit Beach Head. There are also original games written for the C16. Something for everyone, from maze games to simulators.

We start this selection of games in a maze, trying to avoid the dreaded Zobwats! They are the guardians of the maze in which the dismantled parts of your crashed transporter craft have been hidden by the inhabintants of a strange planet. The game is *Dork's Dilemma, by Gremlin Graphics.* You are Dork and you must collect and reassemble the parts of your craft.

We continue with mazes for the next three titles. *Mastertronic's Rockman* places you in a diamond mine attempting to collect enough sparklers to enable you to return to England rich and famous. Greed is a funny thing, and strangely enough there are lots of baddies about trying to steal the diamonds you have worked so hard to find.

We remain underground with *Cave Fighter from Bubble Bus.* Trapped in an underground cave system, your energy is running out. There are many aliens to zap as you try to escape by travelling through all the caves before your energy finally runs out.

Blagger, from Alligata, is a conversion of a popular 64 title. As master burglar, Roger the Dodger, you rob safe after safe always on the look out for ghoulish nightwatchmen.

If you want some good old 'shoot at anything that moves' fun, look at *Space Escort from Atlantis.* Your planet is doomed, and you are escorting space liners carrying your people to the newly conquered world of Sistoria. Just when you thought it was safe to go back into space, wave after wave of alien attackers set out to blast you out of the universe.

Spectipede, from Mastertronic, is for those who are selective about just who they blast to pieces, but not for those who are frightened of creepy crawlies. You must destroy the Spectipede one segment at a time, while looking out for spiders and the enemy ship.

Feeling fruity? Try playing *Matertronic's Tutti Frutti.* As super strawberry, King of the Orchard, (eh!) you must collect all the ripe cherries. Beware the bad apples and the acid apple gang.

Mastertronic's Big Mac, The Maintenance Man, is not about hamburgers! Mac is a scret agent with a mission – to boldly go where no Big Mac has gone before and achieve a complete shut down of the enemy power station.

We will round up this selection with three simulations. *Death Race 16, from Atlantis,* gives you 80 seconds in which to overtake the 70 cars that left you stalled on the starting grid. Instant death results from the slightest mistake.

Formula 1 Simulator, from Mastertronic, is very realistically based on Formula One levels of acceleration, braking and road holding.

Finally, you have been entered for the Mastertronic Gold Cup in *BMX Racers.* There are five courses to undertake and in addition to avoiding hazardous obstacles, you must pick up all marker flags on the way. If you don't, you crash at the finish!

turn to page 80

BASIC for begginnerz

PART II

Bill Donald leads you further along the path of programming in the second installment of our guide to basic programming.

I hope that by now you are starting to become quite familiar with your C16, C64, Plus/4 or C128 and after reading the last installment of the series you are all rareing to go. Before we do, I asked that you became familiar with the SAVING and LOADING of programs. You have probably learned just what the word frustration means that when having spent large amounts of time entering in program listings from books or magazines you forget to SAVE the program, or alternatively RUN it just to see the results with a resultant machine 'crash'.Even worse still, accidentally NEWing it. Yes, you don't have to tell me about that sinking feeling in the pit of the stomach! Moral: don't be afraid of storing the program on tape or disk. I feel a lot of the reluctance to do this stems from a fear of running out of storage space, think of it like this, YOUR TIME is very much more expensive than a £2.00 disk or £0.50 cassette tape.

Computer jargon

One of the biggest problems in computers is coming to terms with the jargon used. It is difficult enough learning how to use the things, let alone looking at and trying to understand what MID$ or ASC means in real life.. At this point I going to have to make an apology for throwing yet another new word at you, a word which is rarely seen or used when discussing computer programming at a beginners level and yet is of such fundamental importance the failure to understand and apply the concepts embodied in this word really make it impossible for you to grasp what computer programming is all about. This word is ALGORITHM. No, it isn't some obscure japanese medieval dance or a method of birth control practised in 19th century Siberia but a description of a process.

For instance, suppose you wanted to brew some beer at home. Assuming of course that you have the ingredients to hand, the instructions or sequence of events or process of manufacture to do this can be detailed as follows:-

1. Boil malt for 2 hours.
2. Simmer hops with resulting liquor for 30 minutes.
3. Dilute with cold water.
4. Add yeast to liquor.
5. Allow to stand and ferment for 14 dsays.
6. Transfer liquor to storage containers.
7. Invite Bill Donald around and consume beer.

If any of the above steps are rearranged then the end-result will not be achieved, not least because I'll be pretty unhappy at being involved with washing-up but there is no way that drinkable beer will be produced. So as you can see for some processes a very clearly defined sequence of steps is necessary. This is an algorithm for producing beer.

Your Commodore computer can only understand very clear, unambiguous instructions and in order for us to produce these instructions in a notation that the machine understands, a computer program or sequence of statements is defined using an algorithm. The programming language selected to communicate can be any one of those languages discussed in the last part of this series, but in this case it will be in BASIC. You can think of an algorithm in whatever terms suits you best, for instance a recipe, an instruction sheet, a flow diagram. But remember that this is only the 'bones' of your computer program, to put 'flesh' on these bones and turn it into a living thing requires a computer language.

So, having drawn up your algorithm you then start to convert it into Commodore BASIC. To make things simpler, especially when a large number of steps are involved which demand an answer to a yes/no or positive/negative it is usual to draw a program flow chart. The stencils for these can be obtained from branches of Menzies or W.H.Smith very cheaply and I would urge everyone reading this series to buy one AND START USING THEM. The symbols on them are standardised and despite my own initial scepticism these stencils are very, very useful tools to learning. There is an old adage in computers which goes something like this, 99% of would-be programmers think they can sit down and start entering from the keyboard a workable program from scratch whilst the other 1% sit down and plan the program, in reality these figures are reversed.

The art of programming

Learning to program computers means, in most peoples minds, wrestling with the intricacies of, for example BASIC. I hope the above has convinced you otherwise and the REAL art of programming is the defining and draughting of the correct algorithm. OK, lets try putting this into action.

Suppose that I want to display a numeric value on the screen and then add to this value a preset amount, again displaying this on the screen. I also want the computer to stop exactly when this value has been added to or incremented by another preset number of times. It sounds really complicated, but it isn't. Construct the algorithm like this:-

1. Clear the screen
2. Select the initial numeric value
3. Type this value into the computer
4. Display this value
5. Add to this value the present amount
6. Count how many times we have done this
7. Is it more than specified number of times? YES then stop No then keep counting

Now convert this into BASIC:-

```
10 PRINT CHR$(147)
20 X = 1
30 PRINT X
```

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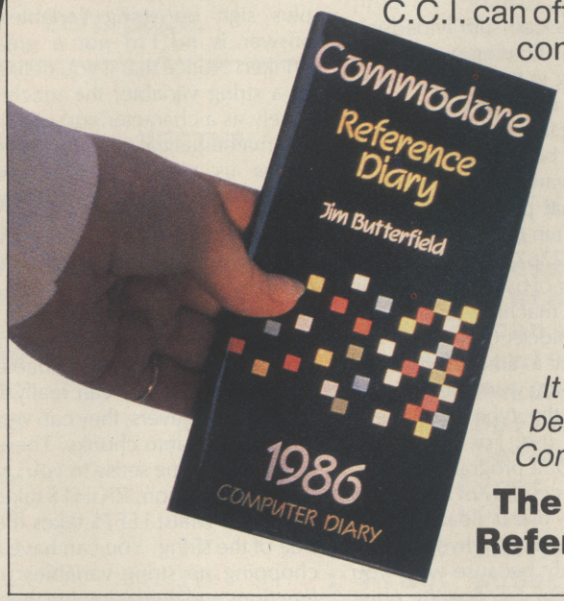

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```
40 X = X + 1
50 FOR C = 1 TO 20
60 NEXT C
70 GOTO 20
```

When you start to compare lines of the algorithm with the program, it should start to make sense.

10 PRINT CHR$(147) : 1. Clear the screen
20 X = 1 : 2. Select the initial numeric value : 3. Type this value into the computer
30 PRINT X : 4. Display this value
40 X = X + 1 : 5. Add to this value the preset amount
50 FOR C = 1 TO 22 : 6. Count how many times we have done this
60 NEXT C : 7. Is it more than the specified number of times? YES then stop
70 GOTO 20 : 7. Is it more than the speicfied number of times? NO then keep counting.

You'll notice that line 20 has two parts to it, I have instructed the machine to use 'X' as the initial value. The reason for this is to stop the machine getting confused with the various numbers that are floating around within the program. These numbers are termed VARIABLES and by attaching letters to these numbers the machine is able to keep track of them, so in this case I have selected the letter X to serve as the initial numeric value VARIABLE. We'll be learning a great deal more about variables, as there are different types and how very important they are to programming. It is essential that you understand what a variable is, so if you are unsure then re-read the above again.

You should, by now see what the function of an algorithm is and how much easier it is to develope a structure to your program, in other words design the program to do exactly what it is required to do. If you develope this approach then the debugging, or unravelling of mistakes becomes much simpler.

What are variables?

Lets go back to this business of VARIABLES and what they are. You will have appreciated from the above program that at any given point within the program the machine has quantities of numbers churning around inside of it. By defining a letter to an initial value of a number I have made what is called in BASIC a NUMERIC variable. Commodore BASIC can support more than the 26 letters of the alphabet for NUMERIC VARIABLES and you can define these to a depth of 2. This means I could have used 'AB' or 'CD' or 'EF' or even 'A1', 'X4' or 'K9' instead of plain 'X' in the program. There are restrictions on certain combinations of letters depending on which machine you have. For instance, the variable 'TI' is used by the computer to keep track of a numeric variable that has to be included in all programs, even if you do not define it yourself, this variable is time. Similarly the variable 'ST' which is short for STATUS is another variable, and this combination of letters should not be taken as a user numeric variable unless you are aware of the effect.

Numeric variables can subdivided into two, integer and floating-point. The variables I was using in the program were floating-point which meant that they could have a value ranging from 0 to 10 followed by 38 noughts and be either negative or positive. Integer variables are whole numbers, no decimal points and have a smaller range, which in Commodore 8-bit mahines run from -32767 to 32768, which is 65535, the number of bytes that make up the memory of the machine (except the C128 which has 2 blocks of 64K but can only use 1 block at a time). Obviously depending on what you want the program to do depends on the type of numeric variable you would use. For instance, a program or section of a program that was very dependant on accuracy of the figures involved would use floating-point variables. If that is the case, why have two different types? Simply because what you make up for in accuracy in floating point variables, you pay for by using up more memory than employing integer variables. Your machine can recognise which type you have selcted by appending the percent '%' to the end of the variable. So in our program changing the 'X' to 'X%' would be worthwhile since we are only going from 1 to 22. To see just how much the difference is on your memory using these variables try changing the size of the counter from 22 to 2000 and the variables from floating-point to integer and then, in direct mode i.e. enter straight from the keyboard the command 'PRINT FRE(0)'.

The third type of variable used in BASIC is termed a string variable and this can be recognised from an integer variable because it uses the dollar '$' suffice. A string variable uses any characters that can entered from the keyboard for display, e.g. letters or graphic symbols as well as numbers. Try the following program which is self-explanatory:-

```
10 A$ = "VAT"
20 B$ = "69"
30 C$ = "IS"
40 D$ = "A"
50 E$ = "GOOD"
60 F$ = "WHISKEY"
70 G$ = "TAX"
80 H$ = "ON"
90 PRINT A$ + B$ + C$ +
D$ + E$ + F$
100 PRINT A$: B$: C$:
D$: E$: F$
110 PRINT A$; B$; C$;
D$; E$; F$
120 PRINT C$; A$; D$; E$;
G$; H$; A$; B$; F$; "?"
```

You should see the effect of using the plus sign on string variables, and the answer is no I'm not a great whiskey drinker! Notice that if you define a number as a string variable, the machine treats it purely as a character and will not perform any mathematical manipulations on it. This brings us nicely to some other string functions RIGHT$, LEFT$ and MID$.

String cleavers

Most people think that a computer is only any good with figures, but as you will see it is just as versatile with letters, or strings of letters which have been bound up in packages of string variables. MID$, RIGHT$ and LEFT$ can really be thought of as string cleavers, they can very precisely cut the string into chunks. They should by now make some sense to you; MID$ takes the centre portion, RIGHT$ takes the right-hand end whilst LEFT$ takes the left-hand side of the string. You can have a lot of fun chopping up string variables using these functions and then rejoining them in freshly named strings to create all sorts of messages within your programs. The exact method of using these functions is well covered in your USER MANUAL and I would suggest that you use the above program to experiment on.

You will notice that I have concentrated on explanations of BASIC rather than providing listings of programs which may look pretty but don't really tell you much about how they work or teach you anything other than marginally improving your keyboard technique. I have also set out to take on fairly early in this series the most difficult parts of BASIC, or so they seemed to me when I was learning it. So the next part will deal with ARRAYS which always struck terror into me when I was confronted with them, I hope that afterwards this will not be the case with you.

When writing a tutorial series such as this it is difficult to assess if you are actually gaining from it. If you do have any questions on the contents then letters to our delectable Editor would be most welcome. Please restrict them to have points raised within this series only and if there is something that you wish me to go over again, then we may have a "Questions Arising" article in the near future.

128 Memory Map: Zero Page

Searching for a memory location you know exists but can't find can be very frustrating. Over the next issues we will be publishing the 128's memory maps. We start this month with zero page.

This is a preliminary zero page memory map for the Commodore 128 when in 128 mode. Much of the memory map is similar to the C-64's although most of it has moved location a byte or two. For instance the start of BASIC pointer has moved up from 44-45 (2B-2C) to 46-47 and yet the real-time jiffy clock and the start of tape buffer pointer locations remain the same.

Without a map I found it very difficult to make the most of my 128 and I know how very frustrating it can be searching for a memory location you know exists but can't find. I am currently up to my neck in reams of memory maps and kernal routines etc. These I hope to get into shape and then into your homes as soon as possible.

HEX	DECIMAL	
0000	0	: 6510 Data direction register.
0001	1	: 6510 Data register
0002-0004	2-4	: SYS Address argument
0005-0009	5-9	: SYS register save area S, A, X, Y, SP
000A	10	: Flag: Scan for quote at end of string
000B	11	: Screen column from last TAB
000C	12	: Flag: 0=LOAD, 1=VERIFY
000D	13	: Input buffer pointer / No of subscripts
000E	14	: Flag: Default array dimension
000F	15	: Data type: $FF=string, $00=numeric
0010	16	: Data type: $00=floating point, $80=integer
0011	17	: Flag: DATA scan / LIST quote / Garbage collect
0012	18	: Flag: subscript ref. / user func. call
0013	19	: Flag: $00=INPUT, $40= GET, $98=READ
0014	20	: Flag: TAN sign / comparison result
0015	21	: ?
0016-0017	22-23	: Temp integer value
0018	24	: Pointer: temp string stack
0019-001A	25-26	: Last temp string address
001B-0023	27-35	: Stack for temp strings
0024-0027	36-39	: Utility pointer area
0028-002C	40-44	: Floating point product of multiply
002D-002E	45-46	: Pointer: start of BASIC
002F-0030	47-48	: Pointer: start of BASIC variables
0031-0032	49-50	: Pointer: start of BASIC arrays
0033-0034	51-52	: Pointer: end of BASIC arrays + 1
0035-0036	53-54	: Pointer: bottom of string storage
0037-0038	55-56	: Utility string pointer
0039-003A	57-58	: Top of string/variable bank (bank 1)
003B-003C	59-60	: Current BASIC line number
003D-003E	61-62	: Pointer to basic text used by chrget, etc:
003F-0040	63-64	: Used by print using
0041-0042	65-66	: Current DATA line number
0043-0044	67-68	: Current DATA item address
0045-0046	69-70	: Vector: INPUT routine
0047-0048	71-72	: Current BASIC variable name
0049-004A	73-74	: Pointer: current BASIC variable data
004B-004C	75-76	: Pointer: index variable for FOR/NEXT
004D-0054	77-84	: ?

0055-0056	85-86	: Flags 'help' or 'list'
0057-0062	87-98	: ?
0063	99	: Paint-left flag
0063	99	: FAC#1 exponent
0064	100	: Paint-right flag
0064-0067	100-103	: FAC#1 mantissa
0068	104	: FAC#1 sign
0069	105	: Pointer: series-eval. constant
006A	106	: FAC#2 exponent
006B-006E	107-110	: FAC#2 mantissa
006F	111	: FAC#2 sign
0070	112	: Sign comparison result: FAC#1 vs #2
0071	113	: FAC#1 low-order (rounding)
0072-0073	114-115	: Pointer: cassette buffer
0074-0075	116-117	: inc. val for auto (0=off)
0076	118	: Flag if 10k hires is allocated
0077-0078	119-120	: Print using's leading zero counter
0079	121	: Used as temp for indirect loads
007A-007C	122-124	: Descriptor for ds$
007D-007E	125-126	: Top of run time stack
007F	127	: Flags run/direct mode
0080-0081	128-129	: Dos parser status word
0082	130	: BASIC zero page storage for graphic commands
0083	131	: Current colour selected
0084	132	: Multicolour 1
0085	133	: Multicolour 2
0086	134	: Foreground
0087-0088	135-136	: X scale
0089-008A	137-138	: Y scale
008B	139	: Stop paint if not background/not same colour
008C-008F	140-143	: Graphics workspace?
0090	144	: Status Byte (I/O)
0091	145	: Stop key flag
0092	146	: Tape temporary
0093	147	: Load or verify flag
0094	148	: Serial buffered character flag
0095	149	: Character buffer for serial
0096	150	: Cassette sync No
0097	151	: Temp for 'BASIN'
0098	152	: How many files are open
0099	153	: Default input device No. Normally 0
009A	154	: Default output device No. Normally 3
009B	155	: Cassette parity
009C	156	: Cassette dipole switch
009D	157	: Operating system message flag
009E-009F	158-159	: Cassette error passes 1&2
00A0-00A2	160-162	: 24 hour clock (jiffy) in 1/60th seconds
00A3-00AB	163-171	: Serial & cassette technical stuff
00AC-00AD	172-173	: Pointer: tape buffer/screen scrolling
00AE-00AF	174-175	: Tape end addresses/end of program
00B0-00B1	176-177	: Tape timing constants
00B2-00B3	178-179	: Address of tape buffer
00B4	180	: RS-232 Out bit count
00B5	181	: RS-232 Next bit to send
00B6	182	: RS-232 Out byte buffer
00B7	183	: Length of current file name
00B8	184	: Current logical file number

00B9	185	: Current secondary address
00BA	186	: Current device number
00BB-00BC	187-188	: Pointer: current file name
00BD	189	: RS-232 Out parity
00BE	190	: Cassette read block count
00BF	191	: Serial word buffer
00C0	192	: Cassette control switch
00C1-00C2	193-194	: I/O start address
00C3-00C4	195-196	: Cassette load temps
00C5	197	: Tape read/write data
00C6	198	: Bank for current load/save/verify operation
00C7	199	: Bank where current filename is found
00C8-00C9	200-201	: RS-232 input buffer pointer
00CA-00CB	202-203	: RS-232 output buffer pointer
00CC-00CD	204-205	: Keyscan table pointer
00CE-00CF	206-207	: Utility string pointer
00D0	208	: Number of characters in keyboard buffer
00D1	209	: Pending function key flag
00D2	210	: Index into pending function key string
00D3	211	: Keyscan shift key status
00D4	212	: Keyscan current key index
00D5	213	: Keyscan last key index
00D6	214	: Carriage return input flag
00D7	215	: 40/80 column mode flag. 0=40
00D8	216	: Text/graphics mode flag
00D9	217	: Ram/rom VIC chr fetch flag (bit 2)
00DA-00DF	218-223	: Programmable key variables
00E0-00E1	224-225	: Pointer to current text line (cursor)
00E2-00E3	226-227	: Pointer to current line colour
00E4	228	: Window lower limit
00E5	229	: Window upper limit
00E6	230	: Window left margin
00E7	231	: Window right margin
00E8	232	: Current input column start
00E9	233	: Current input line start
00EA	234	: Current input line end
00EB	235	: Current cursor physical line number
00EC	236	: Cursor column on current line
00ED	237	: Max number of screen lines
00EE	238	: Max number of screen columns
00EF	239	: Current character to print
00F0	240	: Previous character printed (for<esc>test)
00F1	241	: Current character colour
00F2	242	: Saved colour to print (insert/delete)
00F3	243	: Reverse mode flag
00F4	244	: Quote mode flag
00F5	245	: Insert mode flag
00F6	246	: Auto-insert mode flag
00F7	247	: Disables SHIFT, CTRL and Commodore keys
00F8	248	: Disables screen scrolling. 0=disabled
00F9	249	: Disables bell (beep)
00FA-00FE	250-254	: Free zero page
00FF	255	: ?

Courtesy of Commodore.

POKEing Around — not just a Memory

Memory Scan

Ian Bennet imparts more interesting snippets to make your programming life more fun

Memory scan is a small machine code program which will enable you to examine any section of memory as Ascii, without those annoying control and cursor codes changing your display into something Picasso would have been proud of. The display is made up as follows: First five columns for the memory location, a space, 33 columns of Ascii and then a final space.

The memory location refers to the first ascii character in each line.

The program uses the Basic line number kernal routine to print the memory location. The value in each location is then tested to see if it is a printable Ascii value by using the CMP instruction. When a CMP is used (ie CMP £$20) the carry flag is set if the value compared to the accumulator is less or equal. The flag is reset (0) if it is greater. By using a series of comparison values the non printable characters can be isolated and a full stop substituted. The remaining codes are printed. The stop and space bar keys are then scanned to see if you wish to either pause or exit the program.

Type in the program and save. On running the program "DATA ERROR" will be displayed should any of your data be incorrect. Once you have Memory Scan up and running you will be presented with the message "MEMORY ADDRESS?". To this you should respond with the memory location from where you would like to start your scan. The program will now procede to display the contents on the memory in question. To pause the display press the space bar and hold for as long as you should require. The display may be slowed down holding down the control key. To exit Memory Scan press the RUN/STOP key.

The Machine code portion of the program could be saved seperately and accessed with SYUS 49152. The memory address would then need to be poked into locations 251 and 252 as low byte/high byte. The "peek (253)" is used to stop the Basic loader from reading the data on the second and subsequent runs, thus preventing an annoying pause each time the program is run.

```
10 PRINT CHR$(147)CHR$(5): IF PEEK(253)=28
THEN 40
20 FOR X=49152 TO 49243: READ A: POKE X,A:
C=C+A
30 NEXT: IF C <> 12608 THEN PRINT"DATA
ERROR": END
40 PRINT CHR$(147): INPUT" MEMORY ADDRESS";A
50 POKE 253,28: H=INT(A/256): L=A-(H*256)
60 POKE 251,L: POKE 252,H: SYS 49152
100 DATA 160,000,169,013,032,210,255,166
110 DATA 251,165,252,132,002,032,205,189
120 DATA 164,002,162,008,189,082,192,032
130 DATA 210,255,202,208,247,177,251,201
140 DATA 032,144,010,201,127,144,008,201
150 DATA 160,144,002,176,002,169,046,032
160 DATA 210,255,032,234,255,032,225,255
170 DATA 240,033,165,197,201,060,240,250
180 DATA 200,192,033,208,216,024,169,033
190 DATA 101,251,133,251,144,178,230,252
200 DATA 076,000,192,029,029,029,029,029
210 DATA 029,145,013,096,201,193,240,003

READY.
```

EXAMPLE SCREEN DUMP

```
MEMORY ADDRESS? 40960

40960 .¯+¯CBMBASIC0 A L.¯  ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯
40993 ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯
41026 ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯
41059 ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯
41092 ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯ ¯
41125 EX DAT INPUT INPU DI REA LE GOT R
41158 U/I RESTOR GOSU RETUR/RE STO O/WA
41191 I LOA SAV VERIF DE POK PRINT PRIN
41224 CON LIS CL CM SY OPE/CLOS GE NE
41257 TAB T F/SPC THE/NO STE A N O
41290 SG/IN AB US FR PO SQ RN LO EX
41323 CO SI/TA/AT/PEE LE/STR VA AS CHR
41356 LEFT RIGHT MID G .TOO MANY FILE F
41389 TLE OPE/FILE NOT OPE/FILE NOT FOU
```

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```
: C000 A0 00     LDY #$00     ; SET CHARACTER COUNTER TO 0.
:
: C002 A9 0D     LDA #$0D     ; PRINT A CARRIAGE RETURN.
: C004 20 D2 FF  JSR $FFD2    ;
:
: C007 A6 FB     LDX $FB      ; GET LINE NUMBER.
: C009 A5 FC     LDA $FC      ;
:
: C00B 84 02     STY $02      ; USE LINE NUMBER KERNAL ROUTINE.
: C00D 20 CD BD  JSR $BDCD    ; 'Y' IS STORED IN 02 AS BDCD
: C010 A4 02     LDY $02      ; CHANGES ALL OF THE REGISTERS.
:
: C012 A2 08     LDX #$08     ; AFTER PRINTING THE LINE
: C014 BD 52 C0  LDA $C052,X  ; NUMBER GET BACK INTO
: C017 20 D2 FF  JSR $FFD2    ; POSITION BY PRINTING
: C01A CA        DEX          ; THE EIGHT CURSOR CODES
: C01B D0 F7     BNE $C014    ; STORED AT $C053 ONWARDS.
:
: C01D B1 FB     LDA ($FB),Y  ; GET MEM CONTENTS.
:
: C01F C9 20     CMP #$20     ; IS THE CHARACTER <32.
: C021 90 0A     BCC $C02D    ; YES, THEN PRINT A FULL STOP.
: C023 C9 7F     CMP #$7F     ; IS THE CHARACTER <127.
: C025 90 08     BCC $C02F    ; YES, THEN PRINT THE CHARACTER.
: C027 C9 A0     CMP #$A0     ; IS THE CHARACTER <160.
: C029 90 02     BCC $C02D    ; YES THEN PRINT A FULL STOP.
: C02B B0 02     BCS $C02F    ; NO THEN PRINT THE CHARACTER.
:
: C02D A9 2E     LDA #$2E     ; MAKE CHARACTER A FULL STOP.
: C02F 20 D2 FF  JSR $FFD2    ; PRINT CHARACTER.
:
: C032 20 EA FF  JSR $FFEA    ; TEST FOR STOP KEY.
: C035 20 E1 FF  JSR $FFE1    ;
: C038 F0 21     BEQ $C05B    ; IF PRESSED THEN END.
:
: C03A A5 C5     LDA $C5      ; TEST FOR SPACE BAR.
: C03C C9 3C     CMP #$3C     ;
: C03E F0 FA     BEQ $C03A    ; IF PRESSED TEST AGAIN.
:
: C040 C8        INY          ; HAVE WE PRINTED
: C041 C0 21     CPY #$21     ; ENOUGH CHARACTERS.
: C043 D0 D8     BNE $C01D    ; NO, THEN PRINT MORE.
:
: C045 18        CLC          ; INCREASE LINE NUMBER AND
: C046 A9 21     LDA #$21     ; MEMORY LOCATION VALUE.
: C048 65 FB     ADC $FB      ;
: C04A 85 FB     STA $FB      ;
: C04C 90 B2     BCC $C000    ;
: C04E E6 FC     INC $FC      ;
: C050 4C 00 C0  JMP $C000    ;
:
: C053 1D 1D 1D  ORA $1D1D,X  ; CURSOR CODES.
: C056 1D 1D 1D  ORA $1D1D,X  ; 0D = CARRIAGE RETURN.
: C059 91 0D     STA ($0D),Y  ; 91 = CURSOR UP.
: C05B 60        RTS          ; 1D = CURSOR RIGHT.
```

POKE 22

This program is about as useful as an umbrella would be to a deep sea diver but will serve to demonstrate a couple of ideas suitable for inclusion in your own programs! Type in and run the listing. You will see "PRESS ANY KEY" within a box of stars on your screen. Pressing a key will then list the program. If you examine the listing you will notice that lines 10 – 12 are the same as the display. Notice that the lines do not have any other commands on them (eg print etc). How therefore does the text get onto the screen?

Reading through the programme will hopefully explain.

Line:

0: Sends the programme to line 4.

4: Clears the screen and then prints a chr$(31) which causes all further text to be printed in blue (the same as the background). "GOTO1" is printed next with a chr$(5) changing the text back to white.

5: Pokes the chr$ codes for HOME and CARRIAGE RETURN into the keyboard buffer which lives at locations 631 – 640. Location 198 is poked with a 2. This is to tell the computer how many characters are in the buffer. Note the buffer will be read when the program ends.

6: Poke 22,35 is not the sort of poke you will find in your ever helpful Commodore User manual. This is a curious poke which succeeds in 'turning off' the line numbers when a program is listed.

This it does when the "LIST10-" is carried out. You can see from this how the "PRESS ANY KEY" (Lines 10-12) is displayed. After a list has been performed the program comes to an end regardless of how to where it has been performed. The keyboard buffer now comes into play. The Home code is executed first which places the cursor in the top left hand corner (where we earlier printed "GOTO1") followed by the CARRIAGE RETURN. What this does in effect is to enter GOTO1 in direct mode. This gets the program going again and takes us onto line 1.

1: This poke restores the line numbers.

2: Tests to see if any key is pressed. Once a key is pressed the program will continue with the next line.

3: The last line (Funny, I thought it was the third!) clears the screen, lists the program and then ends.

Such a tiny program yet so many words!! I hope this will give some idea of your more adventurous experiments some new ideas to get to grips with.

```
0 GOTO4
1 POKE22,25
2 GETA$:IFA$=""THEN2
3 PRINTCHR$(147):LIST
4 PRINTCHR$(147)CHR$(31)"GOTO1"CHR$(5)
5 POKE631,19:POKE632,13:POKE198,2
6 POKE22,35:LIST10-
10 ****************************************
11 *              PRESS ANY KEY           *
12 ****************************************

READY.
```

CURSOR CHARACTERS

```
▚ - By pressing the cursor down key
▞ - By pressing the cursor down key with the shift key
▌ - By pressing the cursor right key
▐ - By pressing the cursor right key with the shift key
▘ - By pressing the home key
▝ - By pressing the home key with the shift key
▖ - By pressing the control key and key 1
▗ -                                 key 2
▄ -                                 key 3
▟ -                                 key 4
▙ -                                 key 5
▛ -                                 key 6
▜ -                                 key 7
▀ -                                 key 8
▚ - By pressing the CBM key with    key 1
▞ -                                 key 2
▌ -                                 key 3    ▐ - By pressing key F1
▐ -                                 key 4    ▘ - By pressing key F2
▘ -                                 key 5    ▝ - By pressing key F3
▝ -                                 key 6    ▖ - By pressing key F4
▖ -                                 key 7    ▗ - By pressing key F5
▗ -                                 key 8    ▄ - By pressing key F6
▄ - By pressing the control key and key 9    ▟ - By pressing key F7
▟ -                                 key 0    ▙ - By pressing key F8
```

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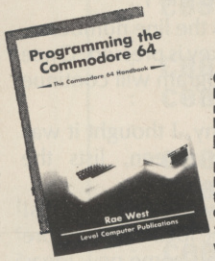

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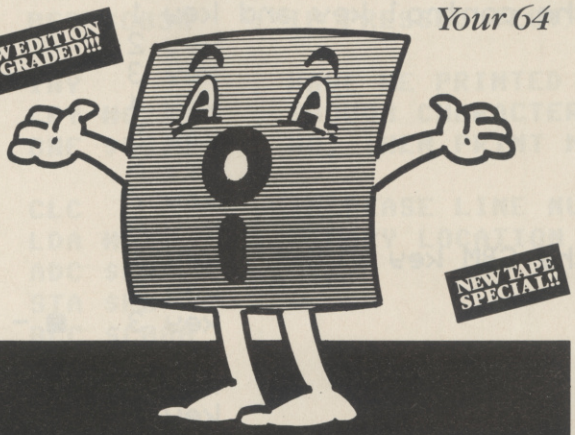

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Numeric to String converter

Convert any numeric expression into a specified string length with this program from Peter Dennison.

This program will take any numeric expression and convert it into a specified string length. Trailing zeros in the decimal part of the number are displayed, and there is a rounding option. Negative numbers can be formatted in three ways: a leading minus sign, a trailing minus sign, or a trailing CR. The two latter options have obvious implications of great importance for commericial programs. The formatting ensures that in a column of numbers the decimal points are in vertical alignment. The string length LEN is constant regardless of the visual length of the string.

Because of the formatted nature of the string, this program can be used in conjunction with the sort program published in Volume 3 Number 6. In this case negative numbers must have a leading minus sign, but will sort in reverse order i.e. -1. -2, -3....-n. However users can overcome this apparent problem by adding any number to all the numbers in the array to ensure that all negative numbers are converted to positive. My program can then be used with the sort program, followed by a subtraction of the previously added number. The result will be that all numbers are correctly sorted i.e. -n...-3, -2, -1, 0, 1, 2,...n

The syntax is SYS49656, Expression, N1, N2, N3, String variable.

The expression can be any numeric variable which would normally follow LET. If the result of the expression is in expotential format then OUT OF NUMERIC RANGE ERROR is generated.

N1 and N2 format the string, and represent the number of characters to the left and to the right of the decimal point. Any attempt to use variables will generate SYNTAX ERROR. The sum of N1 and N2 must be in the range 1-8, but if N2=0 then N1 can be 9. If the sum of N1+N2 is greater than 8 (or 9) then STRING TOO LONG ERROR is generated.

If the image is too small for the result of the expression then OVERFLOW ERROR is generated.

N3 deals with the rounding and negative number options:

N3=0 rounded with leading minus sign
N3=1 truncated with leading minus sign
N3=2 rounded with trailing minus sign
N3=3 truncated with trailing minus sign
N3=4 rounded with trailing CR
N3=5 truncated with trailing CR
N3>=6 generates ILLEGAL QUNATITY ERROR

The string variable is where the string is deposited.

```
 10 033C          !******************************!
 20 033C          !                              !
 30 033C          ! NUMERIC TO STRING CONVERTER  !
 40 033C          !    WITH IMAGE FORMATTING     !
 50 033C          !                              !
 60 033C          !      BY PETER DENNISON       !
 70 033C          !        NOVEMBER 1985         !
 80 033C          !                              !
 90 033C          !******************************!
100 033C          !
110 033C          !
120 C1F8          *=49656
130 C1F8          ADRESS        =  $C1EE
140 C1F8          DECIMALS      =  $C1F4
150 C1F8          INTEGERS      =  $C1F3
160 C1F8          LEADERS       =  $C1F2
170 C1F8          ROUNDING      =  $C1F5
180 C1F8          STRING        =  $C1DE
190 C1F8          STRLEN        =  $C1F1
200 C1F8          !
210 C1F8          !  CLEAR WORK AREAS
220 C1F8          !
230 C1F8 A00F                   LDY #15
240 C1FA A900                   LDA #0
250 C1FC 990001 L16             STA $0100,Y
260 C1FF 99DEC1                 STA STRING,Y
270 C202 88                     DEY
280 C203 10F7                   BPL L16
290 C205          !
300 C205          !  EVALUATE EXPRESSION & CONVERT FAC TO ASCII
```

```
310 C205          !
320 C205 20FDAE              JSR $AEFD
330 C208 20A5A9              JSR $A9A5
340 C20B 20DDBD              JSR $BDDD
350 C20E          !
360 C20E          !  GET & VERIFY N1 & N2
370 C20E          !
380 C20E 20FDAE              JSR $AEFD                  !N1
390 C211 2013B1              JSR $B113                  !CHECK ALPHABETIC
400 C214 9003                BCC L02
410 C216 4C08AF L17          JMP $AF08                  !SYNTAX ERROR
420 C219 209EB7 L02          JSR $B79E
430 C21C E00A                CPX #10
440 C21E 9005                BCC L31
450 C220 A20E   L01          LDX #14                    !ILLEGAL QUANTITY
460 C222 6C0003              JMP ($0300)                !ERROR
470 C225 8EF3C1 L31          STX INTEGERS
480 C228 20FDAE              JSR $AEFD                  !N2
490 C22B 2013B1              JSR $B113                  !CHECK ALPHABETIC
500 C22E B0E6                BCS L17
510 C230 209EB7              JSR $B79E
520 C233 E009                CPX #9
530 C235 B0E9                BCS L01
540 C237 8EF4C1              STX DECIMALS
550 C23A          !
560 C23A          !  CHECK IMAGE SIZE
570 C23A          !
580 C23A E000                CPX #0                     !NO DECIMAL PLACES
590 C23C D005                BNE L05
600 C23E A9F6                LDA #246
610 C240 4C45C2              JMP L06
620 C243 A9F7   L05          LDA #247
630 C245 18     L06          CLC
640 C246 6DF3C1              ADC INTEGERS
650 C249 6DF4C1              ADC DECIMALS
660 C24C 9005                BCC L04
670 C24E A217                LDX #23                    !STRING TOO LONG
680 C250 6C0003              JMP ($0300)                !ERROR
690 C253          !
700 C253          !  CHECK IF EXPRESSION IS IN EXPONENTIAL FORMAT
710 C253          !
720 C253 A00F   L04          LDY #15
730 C255 B90001 L09          LDA $0100,Y
740 C258 C945                CMP #69                    !ASCII E
750 C25A F006                BEQ L07                    !IF EXPONENTIAL FORMAT
760 C25C 88                  DEY
770 C25D F00E                BEQ L08                    !ALWAYS
780 C25F 4C55C2              JMP L09
790 C262 A9C3   L07          LDA #>TEXT1
800 C264 A8                  TAY
810 C265 A9EE                LDA #<TEXT1
820 C267 201EAB L38          JSR $AB1E                  !SEND ERROR MESSAGE
830 C26A 4C62A4              JMP $A462                  !IN LINE #
840 C26D          !
850 C26D          !  CHECK IF EXPRESSION FITS THE IMAGE
860 C26D          !
870 C26D A001   L08          LDY #1
880 C26F B90001 L11          LDA $0100,Y
890 C272 F008                BEQ L10                    !TERMINATOR
```

```
 900 C274 C92E                CMP #46                    !DECIMAL POINT
 910 C276 F004                BEQ L10
 920 C278 C8                  INY
 930 C279 4C6FC2              JMP L11
 940 C27C 88      L10         DEY
 950 C27D 8CF2C1              STY LEADERS                !ACTUAL NUMBER OF
 960 C280 CCF3C1              CPY INTEGERS               !INTEGERS
 970 C283 F007                BEQ L12
 980 C285 9005                BCC L12
 990 C287 A20F                LDX #15                    !OVERFLOW ERROR
1000 C289 6C0003              JMP ($0300)
1010 C28C         !
1020 C28C         !  CALCULATE NUMBER OF LEADING SPACES
1030 C28C         !
1040 C28C AD0001 L12          LDA $0100
1050 C28F 8DDEC1              STA STRING
1060 C292 ADF3C1              LDA INTEGERS
1070 C295 38                  SEC
1080 C296 EDF2C1              SBC LEADERS
1090 C299 8DF2C1              STA LEADERS
1100 C29C A000                LDY #0
1110 C29E CCF2C1 L14          CPY LEADERS                !PLACE LEADING SPACES
1120 C2A1 F009                BEQ L13                    !BEFORE COMPUTED NUMBER
1130 C2A3 A920                LDA #$20
1140 C2A5 99DFC1              STA STRING+1,Y
1150 C2A8 C8                  INY
1160 C2A9 4C9EC2              JMP L14
1170 C2AC         !
1180 C2AC         !  TRANSFER EXPRESSION TO STRING
1190 C2AC         !
1200 C2AC A200   L13          LDX #0
1210 C2AE BD0101 L03          LDA $0101,X
1220 C2B1 F008                BEQ L15
1230 C2B3 99DFC1              STA STRING+1,Y
1240 C2B6 C8                  INY
1250 C2B7 E8                  INX
1260 C2B8 4CAEC2              JMP L03
1270 C2BB         !
1280 C2BB         !  GET & VERIFY N3
1290 C2BB         !
1300 C2BB 20FDAE L15          JSR $AEFD
1310 C2BE 2013B1              JSR $B113                  !CHECK ALPHABETIC
1320 C2C1 9003                BCC L35
1330 C2C3 4C08AF              JMP $AF08                  !SYNTAX ERROR
1340 C2C6 209EB7 L35          JSR $B79E
1350 C2C9 E006                CPX #6
1360 C2CB 9005                BCC L34
1370 C2CD A20E                LDX #14                    !ILLEGAL QUANTITY
1380 C2CF 6C0003              JMP ($0300)                !ERROR
1390 C2D2 8EF5C1 L34          STX ROUNDING
1400 C2D5         !
1410 C2D5         !  COMPUTE STRING LENGTH (TRAILING ZEROS)
1420 C2D5         !
1430 C2D5 A0FF                LDY #$FF
1440 C2D7 C8     L30          INY
1450 C2D8 B9DEC1              LDA STRING,Y
1460 C2DB F007                BEQ L20                    !NO DECIMAL POINT
1470 C2DD C92E                CMP #46                    !DECIMAL POINT
1480 C2DF D0F6                BNE L30
1490 C2E1 4CE9C2              JMP L36
```

```
1500 C2E4 A92E   L20        LDA #46                    !DECIMAL POINT
1510 C2E6 99DEC1            STA STRING,Y
1520 C2E9 98     L36        TYA
1530 C2EA 18                CLC
1540 C2EB 6DF4C1            ADC DECIMALS
1550 C2EE 8DF1C1            STA STRLEN
1560 C2F1        !
1570 C2F1        !  PLACE TRAILING ZEROS
1580 C2F1        !
1590 C2F1 A8                TAY
1600 C2F2 B9DEC1 L26        LDA STRING,Y
1610 C2F5 C930              CMP #$30
1620 C2F7 B00D              BCS L21
1630 C2F9 C92E              CMP #46                    !DECIMAL POINT
1640 C2FB F009              BEQ L21
1650 C2FD A930              LDA #$30                   !DECIMAL ZERO
1660 C2FF 99DEC1            STA STRING,Y
1670 C302 88                DEY
1680 C303 4CF2C2            JMP L26
1690 C306        !
1700 C306        !  DO ROUNDING
1710 C306        !
1720 C306 ADF5C1 L21        LDA ROUNDING
1730 C309 2901              AND #1
1740 C30B D043              BNE L37
1750 C30D 88                DEY
1760 C30E 18                CLC
1770 C30F B9E0C1            LDA STRING+2,Y
1780 C312 6905              ADC #5
1790 C314 C93A              CMP #$3A                   !DECIMAL 10
1800 C316 9038              BCC L37                    !ROUNDING COMPLETE
1810 C318 4C3BC3            JMP L32
1820 C31B B9DFC1 L27        LDA STRING+1,Y
1830 C31E 18                CLC
1840 C31F 6901              ADC #1
1850 C321 99DFC1 L18        STA STRING+1,Y
1860 C324 C93A              CMP #$3A
1870 C326 9028              BCC L37
1880 C328 38                SEC
1890 C329 E90A              SBC #10
1900 C32B 99DFC1            STA STRING+1,Y
1910 C32E 88                DEY
1920 C32F C0FF              CPY #$FF
1930 C331 D008              BNE L32
1940 C333 A9C4              LDA #>TEXT2
1950 C335 A8                TAY
1960 C336 A903              LDA #<TEXT2
1970 C338 4C67C2            JMP L38
1980 C33B B9DFC1 L32        LDA STRING+1,Y
1990 C33E C92E              CMP #46                    !DECIMAL POINT
2000 C340 F00A              BEQ L19
2010 C342 C920              CMP #$20                   !SPACE
2020 C344 D0D5              BNE L27
2030 C346 18                CLC
2040 C347 6911              ADC #$11                   !CONVERT SPACE TO
2050 C349 4C21C3            JMP L18                    !DECIMAL 1
2060 C34C 88     L19        DEY
2070 C34D 4C1BC3            JMP L27
2080 C350        !
2090 C350        ! REMOVE DECIMAL POINT IF N2=0
```

```
2100 C350          !
2110 C350 ADF4C1 L37          LDA DECIMALS
2120 C353 D003                BNE L28
2130 C355 CEF1C1              DEC STRLEN
2140 C358          !
2150 C358          !  CHECK IF NEGATIVE NUMBER
2160 C358          !
2170 C358 ADDEC1 L28          LDA STRING
2180 C35B C92D                CMP #45                    !MINUS SIGN
2190 C35D D037                BNE L25
2200 C35F ADF5C1              LDA ROUNDING
2210 C362 4A                  LSR A
2220 C363 F031                BEQ L25                    !LEADING MINUS SIGN
2230 C365 AA                  TAX
2240 C366 A920                LDA #$20
2250 C368 8DDEC1              STA STRING
2260 C36B E002                CPX #2
2270 C36D F00F                BEQ L29
2280 C36F ACF1C1              LDY STRLEN
2290 C372 A92D                LDA #45                    !MINUS SIGN
2300 C374 99DFC1              STA STRING+1,Y
2310 C377 C8                  INY
2320 C378 8CF1C1              STY STRLEN
2330 C37B 4C96C3              JMP L25
2340 C37E ACF1C1 L29          LDY STRLEN
2350 C381 A920                LDA #$20
2360 C383 99DFC1              STA STRING+1,Y
2370 C386 C8                  INY
2380 C387 A943                LDA #67                    !C
2390 C389 99DFC1              STA STRING+1,Y
2400 C38C C8                  INY
2410 C38D A952                LDA #82                    !R
2420 C38F 99DFC1              STA STRING+1,Y
2430 C392 C8                  INY
2440 C393 8CF1C1              STY STRLEN
2450 C396          !
2460 C396          !  GET & VERIFY STRING VARIABLE
2470 C396          !
2480 C396 A000   L25          LDY #0
2490 C398 20FDAE              JSR $AEFD
2500 C39B A001                LDY #1
2510 C39D B17A   L24          LDA ($7A),Y
2520 C39F C924                CMP #36                    !DOLLAR SIGN
2530 C3A1 F00D                BEQ L22
2540 C3A3 C002                CPY #2
2550 C3A5 D005                BNE L23
2560 C3A7 A216                LDX #22                    !TYPE MISMATCH
2570 C3A9 6C0003              JMP ($0300)                !ERROR
2580 C3AC C8     L23          INY
2590 C3AD 4C9DC3              JMP L24
2600 C3B0          !
2610 C3B0          !  PERFORM MODIFIED 'LET' FUNCTION
2620 C3B0          !
2630 C3B0 208BB0 L22          JSR $B08B
2640 C3B3 8549                STA $49
2650 C3B5 844A                STY $4A
2660 C3B7 A9C1                LDA #>STRING
2670 C3B9 8DF0C1              STA STRLEN-1
2680 C3BC A9DE                LDA #<STRING
2690 C3BE 8DEFC1              STA STRLEN-2
2700 C3C1 A9EB                LDA #<ADRESS-3
```

```
2710 C3C3 8550                STA $50
2720 C3C5 A9C1                LDA #>ADRESS
2730 C3C7 8551                STA $51
2740 C3C9 207DB4              JSR $B47D
2750 C3CC ADF4C1              LDA DECIMALS
2760 C3CF EEF1C1              INC STRLEN                  !LEADING SPACE/MINUS
2770 C3D2 4CD5C3              JMP L33
2780 C3D5 A2DE    L33         LDX #<STRING
2790 C3D7 A0C1                LDY #>STRING
2800 C3D9 2088B6              JSR $B688                   !TFR STRING TO MEMORY
2810 C3DC A000                LDY #0
2820 C3DE ADF1C1              LDA STRLEN                  !FINAL STRING LENGTH
2830 C3E1 9149                STA ($49),Y
2840 C3E3 C8                  INY
2850 C3E4 A9DE                LDA #<STRING
2860 C3E6 9149                STA ($49),Y
2870 C3E8 C8                  INY
2880 C3E9 A9C1                LDA #>STRING
2890 C3EB 9149                STA ($49),Y
2900 C3ED 60                  RTS                         !BACK TO BASIC
2910 C3EE         !
2920 C3EE         ! ERROR MESSAGES
2930 C3EE         !
2940 C3EE 4F5554 TEXT1        TXT "OUT OF NUMERIC RANGE"
2950 C402 00                  BRK
2960 C403 524F55 TEXT2        TXT "ROUNDING OVERFLOW"
2970 C414 00                  BRK
```

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Tape It on Pet

Transfer programs from disk to tape easily with this program from A Eskelson written for the PET. The author suggests that the program will also work on the 64

The program TAPEIT is designed for use on a Commodore PET or C64. TAPEIT was produced when several copies of a suite of programs on tape was required, and it seemed that it was a waste of time to wait around during this process, after all repetitive operations are what computers are best at. There are several ways of transferring programs from disk to tape, but most make use of direct access commands to the disk and a fair amount of machine code is usually needed.

TAPEIT produces the same effect by making use of Commodore's screen editor. This is done by printing the commands to the screen and then forcing the computer to believe that they have been typed in by hand. This is done by POKEing a sequence of carriage return characters into the keyboard buffer. If there was text under the cursor when the return was performed, and if that text was a command, then that command would be executed. It is this method that TAPEIT uses, so all the program has to do is a little printing to the screen in the correct places.

Program description

Lines 70 – 120 Tests for PET or C64

The C64 has RAM at location 49152 so it can be changed with a poke. Just in case this is being used for program use the original value is restored after the test. The PET has ROM or nothing at this location so POKEing has no effect.

Lines 130 – 180 Setup values for the PET

Lines 190 – 230 Setup values for the C64

The differences in the system locations of the C64 and the PET require different parameters, so the values for the working memory and the keyboard buffer and keyboard queue need to be changed. The variable DD holds the location of a spare byte of memory, KQ holds the location of the keyboard queue, and KB the location of the keyboard buffer.

Lines 250 – 320 read the names of the programs into the data array, this has to be reset every time the program is loaded, so to keep the point in the array that the program has reached the location DD is used as this is not reset when the program is reloaded.

Lines 330 – 390 use the location DD to point to the position in the array of the next program to transfer.

Lines 400 – 490 update the location DD and print the commands onto the screen.

Lines 500 – 580 set up seven carriage returns in the keyboard buffer.

Program Use

The program is prepared for use by editing or adding, as required the lines from 590 onwards. Simply insert the names of the programs that you wish to transfer as data. eg

590 DATA "PROG1"
600 DATA "PROG2"
nnnn "END"

The last entry in the list must be the word "END", remember the names and the word END must be inside quotes.

Reserve the program using the same name as in line 460 (TAPEIT) if you wish to change the name you must also change line 460. Ensure that the programs that you wish to transfer are on the disk, load TAPEIT and RUN. The first time that the program is run, you will get the normal PRESS PLAY AND RECORD ..... message, but from then on the process is automatic, assuming that your tape does not run out!.

```
10 REM THIS WILL READ THE FILES
20 REM CONTAINED IN B$ AND
30 REM COPY THEM TO TAPE.
40 REM THE SCREEN EDITOR IS
50 REM USED TO PERFORM THE LOAD
60 REM
70 REM FIND OUT IF PET OR 64
80 A=PEEK(49152)
90 POKE 49152,45
100 IF PEEK(49152)=45 THEN 120
110 GOTO 130 :REM PET DATA
120 POKE 49152,A:GOTO 190
130 REM SETUP FOR PETS
140 KQ=158:KB=623:DD=0
150 PRINT "▚           DISK TO TAPE"
160 PRINT "          RUNNING ON PET"
170 FOR T=1 TO 1000 :NEXT
180 GOTO 250
190 REM SETUP FOR C64
200 KQ=198:KB=631:DD=251
210 PRINT "▚           DISK TO TAPE"
220 PRINT "          RUNNING ON C-64"
230 FOR T=1 TO 1000 :NEXT
```

```
240 REM
250 REM READ FILENAMES
260 DIM A$(20):REM MAX NUM. OF FILES
270 I=1
280 READ BB$
290 IF BB$="END"THEN310
300 A$(I)=BB$:I=I+1:GOTO280
310 MX=I+1:REM NUMBER OF FILES
320 IF PEEK(DD)>MX THEN POKE DD,1
330 REM
340 REM NOW GET THE FILE AND SAVE
350 REM IT TO TAPE
360 REM
370 A=PEEK(DD)
380 IF A=I THEN POKE DD,1:STOP
390 B$=A$(A):REM GET FILE NAME
400 A=A+1:POKE DD,A
410 PRINT"[illegible]"
420 PRINT "LOAD";CHR$(34);B$;CHR$(34);",8"
430 PRINT"[illegible]"
440 PRINT "SAVE";CHR$(34);B$;CHR$(34)
450 PRINT"[illegible]"
460 PRINT "LOAD";CHR$(34);"TAPEIT";CHR$(34)",8"
470 PRINT"[illegible]"
480 PRINT "RUN"
490 PRINT"[illegible]"
500 POKE KQ,7
510 POKE KB,13
520 POKE KB+1,13
530 POKE KB+2,13
540 POKE KB+3,13
550 POKE KB+4,13
560 POKE KB+5,13
570 POKE KB+1,13
580 END
590 DATA "PROG1"
600 DATA "PROG1"
610 DATA "PROG1"
620 DATA "PROG1"
630 DATA "END"
```

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1541 device number changes

With the recent price reductions on the 1541 disk drive, there has been a considerable increase in the number of people who own a disk drive. This price reduction has also caused many disk drive owners to consider a second drive to reduce the number of times a disk has to be changed over and to increase the amount of on line data available. The disk drive is designed to allow up to four drives to be attached at once. In order to do this, the drive numbers must be changed.

There are two methods to change the device number. First is the software method which is ideal if an additional drive is to be used for only a short time – for example if you have borrowed one from a friend. This method is quite well covered by the 1541 Users Manual.

The second method is the hardware method which changes the device number more permanently thus allowing the second drive to be used as soon as switched on. The description in the Users Manual is not very clear however and, on checking my disk drive, not very accurate either.

It is hoped that this article will help to make it clearer.

1. Remove all leads from the disk drive. It is especially important to ensure that the mains lead is removed.

2. Turn the drive upside down. This will reveal four x-point screws recessed about 3cm below the base, one in each corner.

3. With a x-point screwdriver remove the four screws and place them somewhere safe.

4. Hold the top and bottom of the drive firmly together and turn it the right way up.

5. Carefully remove the top cover by simply holding the sides and lifting, place the top cover safely out of the way.

6. Compare the drive with the diagram making sure that the front of the drive is in the same position as the front of the drive in the diagram.

7. On the circuit board 16cm from the front and 8cm from the left hand side (looking from the front) you will observe two small circles, one behind the other, made up of what look like back to back 'D's. These are what governs the disk drive device number. The small inter-connecting link between the 'D's must be broken to change the device number.

If you wish to change to device number 9, then just break the link on the front circle using a knife or other suitable implement and rebuild the drive in reverse order. For device number 10, break only the rear link and for device number 11, break both links.

8. Having reassembled the disk drive, carry out a test with just one disk drive connected to ensure the modification was successful. If the device number has not changed it will most likely be due to an incomplete breaking of the link.

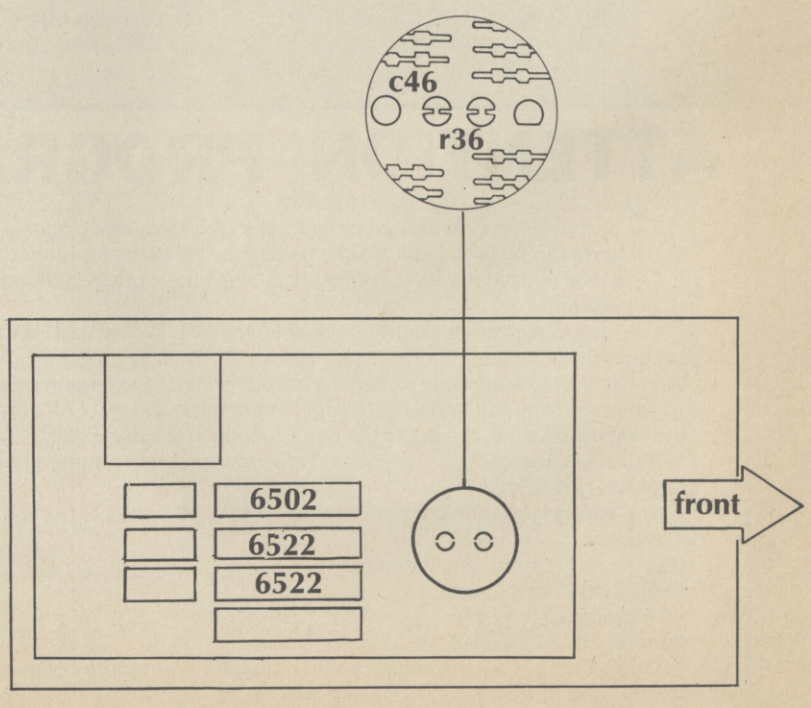
This method of conversion works because when the drive is turned on, one of its start up tasks is to check these links to get the device number which it then stores in RAM. When the command is sent down the serial bus telling a device to prepare to reciave a message or to prepare to send a message the disk drive checks against this number to see if the command was meant for it. If it is it can then reply.

For those interested in the more technical side the following is what happens in detail.

The two links discussed above are connected to Veratile Interface Adapter number 1 port B bits 5 and 6 at address $1800 (6144 decimal). These bits are normally set to 1's but if the links are still connected they pull the bits down to 0's. When the disk drive is turned on the start up routine reads port B and isolates bits 5 and 6. These are then sifted to positions 0 and 1 thus creating the number to add to 8 to find the device number. As well as adding 8 a further $40 (64 decimal) is added to produce the code for TALK and stored in location $78 (120 decimal) for later use. The code for LISTEN is produced by adding $20 (32 decimal) and stored in location $77 (119 decimal).

These numbers are produced automatically by the Kernal routines when using the computer, both from basic or machine code using the standard Kernal routine calls, but should be looked out for if accesing the Kernal more directly.

Michael Tinker



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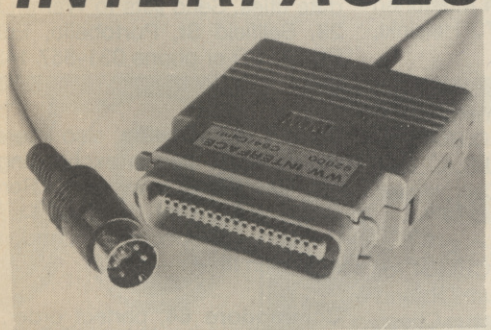

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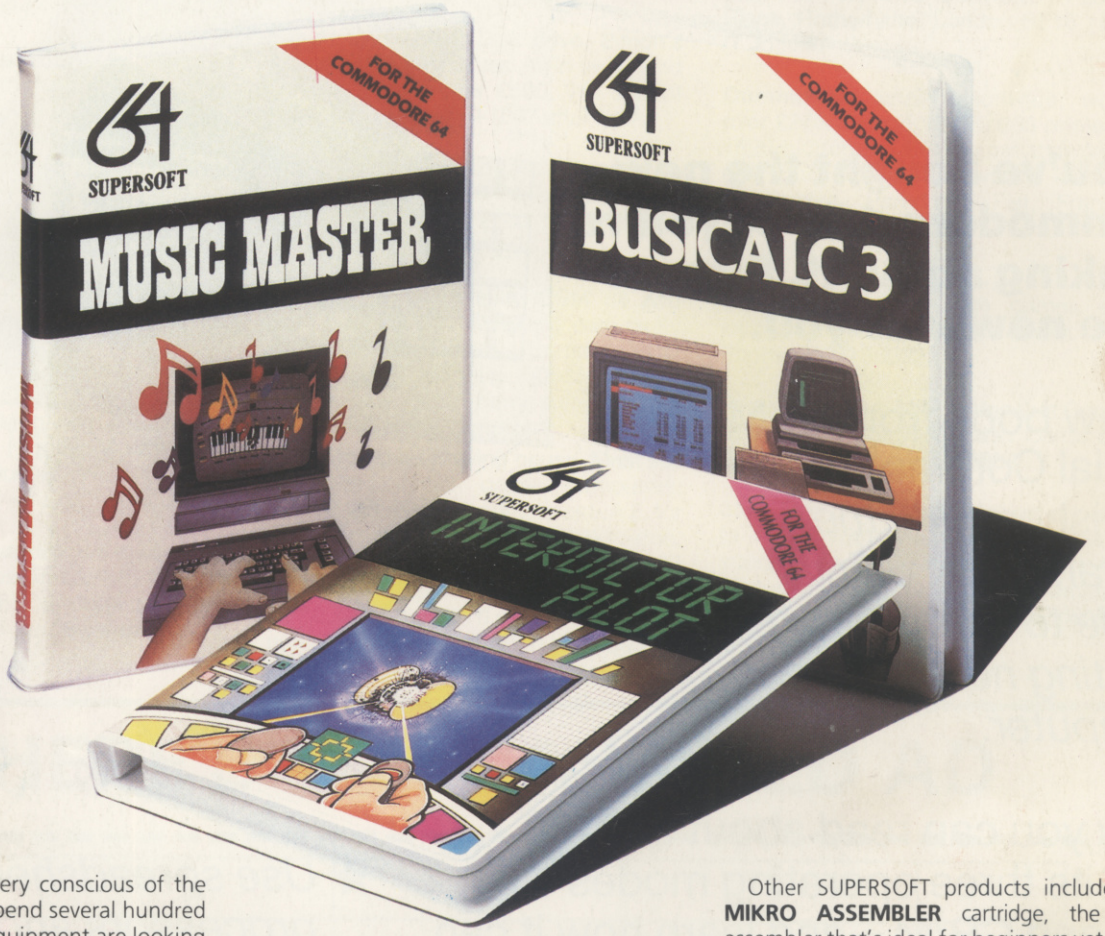

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